THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

Rooms—No. 39 Nassau Street, cor. Liberty Street, opposite the Post-Office, New York.

LONDON:—TRUBNER & CO., No. 60 PATERNOSTER ROW.

VOL. IV.—No. 69. NEW-YORK, SATURDAY, NOVEMBER 1, 1862. $3 PER ANNUM.

HERRING'S PATENT

Champion Fire-Proof Safes.

Herring's Champion Burglar-Proof Safes, with Herring & Floyd's New Patent Crystalized Iron, the only metal which cannot be drilled.

Nearly 25,000 Herring's Safes have been made and sold, and over 500 have passed triumphantly through accidental Fires, thus fully sustaining their acknowledged and well-earned character as the "best Fire-Proof Safes the world ever saw."

Herring's New Patent Burglar-Proof Safes, made of a combination of Wrought Iron, Patent Crystalized Iron, and Bars of Steel, are confidently offered to the public as the strongest and best security against skilful burglars now extant.

It was a "Herring's Burglar-Proof Safe," the public will remember, which so lately held secure its trust against the determined ingenuity of the boldest and greatest mechanical burglars this country has ever known, and saved for the New York Exchange Bank no less than

HALF A MILLION OF DOLLARS.

Herring's Patent Fire and Burglar-Proof Safes *combined*, (one Safe within another,) making the most perfect protection from fire and thieves now known.

FIVE OF HERRING'S SAFES VICTORIOUS!

WELLSBORO', Penn., December 21, 1861.

Messrs. Herring & Co., New York:

Gentlemen,—At the great fire which occurred here on the 18th December last, my store, with a number of other buildings, was entirely destroyed; no less than seven places of business were burnt out and five of your safes severely tested, in every instance saving their entire contents, to the complete and perfect satisfaction of the owners. Two of your Herring's Patent Champion Safes which were in my building remained there through the entire conflagration, and were not opened until the day after the fire. No water was thrown on the building. Everything in my safe after the fire was nearly as good as new. C. L. Wilcox also preserved all his books, papers, and money in two of your safes, both being in same fire. Wm. Roberts was also the fortunate owner of another of your Patent Champion Safes, which was severely tested, and saved completely his books, papers, and money. The result has given great satisfaction, and we want no safe but Herring's Champion. Please send me one same size I last bought of you immediately. Send by N. Y. & Erie R.R. via Tioga depot. JOHN R. BOWEN.

I had two of Herring's Safes in above fire. They saved my books, papers, and $2,000 *in bank bills.* C. L. WILCOX.

HERRING'S PATENT CHAMPION saved my books, papers, and about $400 in *paper money.* I would use no other. WILLIAM ROBERTS.

GREAT FIRE IN PEARL AND FULTON STS.

NEW YORK, Jan. 27, 1862.

Messrs. HERRING & Co., No. 251 Broadway:

Gentlemen,—The large HERRING'S PATENT CHAMPION SAFE you made for me a few years ago has been put to a severe test in the great fire corner Fulton and Pearl sts., on the 26th inst., which entirely destroyed my building, together with many others.

The fire commenced about 6 o'clock on Sunday morning, and the safe was taken from the ruins after an exposure of more than thirty hours.

Your Safe contained all my books, insurance policies, and other valuable papers besides, gold and silver, bank bills, coupon bonds, &c., amounting to over Two Hundred Thousand Dollars. Everything in the Safe is in perfect order, except the binding of the books being steamed.

Your Patent Champion Safe gives us great satisfaction, and has guarded safely through the fire every dollar of its contents.

Truly yours, A. S. FOSTER.

GREAT FIRE IN NEW JERSEY.

NEW BRUNSWICK, N. J., January 18th, 1862.

Messrs. HERRING & Co.,

No. 251 Broadway, New York:

Gentlemen,—At the recent extensive fire in our city, on Wednesday morning last, 15th inst., I was the fortunate owner of one of your HERRING'S PATENT CHAMPION SAFES, which contained some books and a number of valuable papers.

The heat in my store was very great, and the safe subject to an intense heat. I felt great interest in the safety of my papers, as a number of castings in my store and within a few feet of the safe were melted. Nothing, indeed, was saved in my building, except the contents of your safe, which I am happy to inform you was completely preserved, after a thorough roasting for some seventeen hours. The result has exceeded my anticipations, and fully confirmed my confidence in the security of your Herring's Patent Safe. Please send me another of larger size, and refer all incredulous to my books and papers, which it gives me great pleasure to show.

WM. H. ARMSTRONG.

Herring & Co., 251 Broadway.
Farrel, Herring & Co., Phila.
Herring & Co., Chicago.

IRON FOUNDRIES.

BERGEN IRON WORKS, Established 1833.

R. A. BRICK, Manufacturer of CAST IRON WATER and GAS-PIPES. RETORTS, PIPES, &c., always on hand. Office, 109 Leonard Street, New York.

S. V. MERRICK, J. VAUGHAN MERRICK, W. H. MERRICK.

SOUTHWARK FOUNDRY, Philadelphia.

MERRICK & SONS, Engineers, Manufacturers of every description of Gas Machinery.

Retorts, Bench Castings, Condensers, Washers, Scrubbers, Wet or Dry Lime Purifiers, Coke Wagons, Fire Tools, Wrought Iron Grate Bars, Gasholders, either TELESCOPIC OR SINGLE, WITH SUSPENSION FRAMES COMPLETE; Wrought Iron Roof Frames, for Iron or Slate; Stop Cocks, Exhausters, Steam Pumps, Boilers and Tanks, Steam or Hand Air Pumps for proving Street Mains, Centre Seals, Governors, Wrought or Cast-Iron Lime Sieves for Purifiers, Purifier Hoisting Machines, &c., &c.

Address— MERRICK & SONS, 5th and Washington Streets, Philadelphia.

S. FULTON & CO., (Successors to Colwell & Co.) Manufacturers of Pig Iron and Cast Iron Gas and Water Pipes, also Heavy and Light Castings of every description, No. 207 North Water street and 206 North Wharves, Philadelphia.

SAMUEL FULTON, THEO. TREWENDT.

TRAINER & MERCER, 117 NORTH Water Street, & 124 North Wharves, Philadelphia, AGENTS FOR THE MERCER FOUNDRY, AND ELK SHEET IRON WORKS.

CAST IRON STREET MAINS; *Bends, Branches, Chemical Retorts, and all kinds of Castings for* GAS-WORKS, either COAL or ROSIN WORKS. SHEET IRON FOR GASOMETERS *cut and punched to order.* BOILER IRON *of all descriptions.* RUSSIA SHEET IRON, TIN PLATES, BLOCK TIN, COPPER, PIG LEAD, SPELTER, and Metals generally.

FLORENCE IRON WORKS.—The subscriber is prepared to execute orders and make contracts for Cast-Iron Water and Gas-Pipes, from 2 inches to 48 inches in diameter; also, Retorts, Bench-Castings, Branches, Bends, and all Castings for Water or Gas-Works. Pipes and Castings coated with Smith's Patent Coal Tar Varnish to prevent corrosion.

JOSEPH G. JONES,
205½ Walnut Street, Philadelphia.

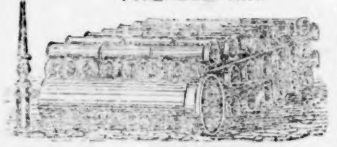
R. D. WOOD & CO.,

MANUFACTURERS OF

CAST-IRON PIPE, RETORTS, &c.

Office, 400 Chestnut Street,

PHILADELPHIA.



TO GAS AND WATER COMPANIES:

The undersigned, Agent for Messrs. Thomas Edington & Sons, Phenix Foundry, Glasgow, Scotland, is prepared to contract for all descriptions of Cast-Iron Pipes of their manufacture.

About 6,000 tons of these Pipes have lately been supplied to the Brooklyn Water-works, N. Y., and the Chief Engineer of the Works, A. P. Kirkwood, Esq., is ready to testify to their excellent quality.

ARCH'LD BAXTER, 28 Beaver St., N. Y.

Sole Agent for the United States and Canada

THE ALPHA TUBE WORKS,

WALSALL, STAFFORDSHIRE,—Established 1830.

LAMBERT BROTHERS, Manufacturers of

LAP-WELDED BOILER TUBES, LOCOMOTIVE AND MARINE ENGINE FITTINGS,

WROUGHT IRON WELDED PIPE,

FOR STEAM OR HIGH-PRESSURE WATER AND GAS;

HIGH-PRESSURE STEAM AND WATER VALVES,

FIRE & GARDEN ENGINE WORK, PUMPS, HYDRANTS, WATER-CLOSETS,

IRON AND BRASS GAS-FITTINGS, GASELIERS, &c.,

AND OF THE GROVE BEDSTEAD WORKS, WALSALL.

Delivery Free, in Liverpool, &c.

Catalogues post free.

A small *general* selection of current Manufactures for the Steam-engine, Water Supply, Gas-Works, Distilleries, Brewery, Chemical Works, Mills, &c., at the International Exhibition, Walsall Court, Class 31.

IRON FOUNDRIES.

MORRIS, TASKER & CO., PASCAL IRON WORKS,

[ESTABLISHED 1821.]

PHILADELPHIA, manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues,

GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast-Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal Gas-works,; Cast-Iron Street Mains, Bends, Branches, Drips, &c.

GAS AND STEAM FITTERS' TOOLS, &c.

STEPHEN MORRIS, CHAS. WHEELER.
THOMAS S. TASKER. STEPHEN P. M. TASKER.

CAST IRON WATER, GAS, DRAIN AND HEATER PIPES, &c.,

COLUMBIAN IRON WORKS,

OFFICE, No. 46 NORTH SEVENTH STREET, Below Arch Street, Philadelphia.

THOS. M. ADAMS, Proprietor.

S. S. ASHCRAFT, CINCINNATI, O., Manufacturer of Gas and Water-Pipes, with Branches of every description; Retorts for Gas and Oil Works; Gasholder Stands, Columns, &c.; Gas Purifiers, Condensers, and Gas Apparatus of all kinds; Foundry Work in general.

N. B.—A complete selection of Patterns on hand. Refer to any of the Gas-Works in the Western and Southwestern States.

THEODORE SCOWDEN, Engineer, Louisville.
JOHN JEFFREY, Civil Engineer, Cincinnati.
JACOB HOUGHTON, Engineer, Detroit.

WARREN FOUNDRY AND MACHINE CO., Phillipsburg, N. J. Manufacturers of Cast-Iron Pipes, from 2 to 48 inch diameter, all pipes from 3 inch to 48 inch cast vertically, and in dry sand, in lengths of 12 feet. 2 inch pipes in lengths of 7 feet. Special Castings of all descriptions furnished at short notice.

REFERENCES.

Croton Aqueduct dept., N. Y.
Manhattan Gas Lt. Co., N. Y.
Brooklyn Water dept., N. Y.
Brooklyn Gas Lt. Co., N. Y.
Citizens' Gas Lt. Co., Brooklyn, N. Y.

TO VERTICAL PIPE MANUFACTURERS.—WANTED, a situation as Foreman, or would prefer taking the work by contract, by a man that has had twenty years' experience in Vertical Pipe Moulding; also, has had some years' experience in Green Sand Moulding; best of reference given, by addressing FIRTH & INGHAM, Warren Foundry and Machine Shop, Phillipsburg, New Jersey.

PATENT-OFFICE NOTICES.

UNITED STATES PATENT-OFFICE,
WASHINGTON, April 17, 1862.

ON THE PETITION OF PHEBE Ann Fisk, Executrix, &c., of Almond D. Fisk, late of the City, County, and State of New York, praying for the extension of a Patent granted to the late Almond D. Fisk, Nov. 14, 1848, and re-issued March 6, 1860, for an improvement in Coffins, for seven years from the expiration of said Patent, which takes place on the 14th day of November, 1862.

It is ordered that the said petition be heard at the Patent-Office on Monday, the 27th of October next, at 12 o'clock m.; and all persons are notified to appear and show cause, if any they have, why said petition ought not to be granted.

Persons opposing the extension are required to file in the Patent-Office their objections specially set forth in writing at least twenty days before the day of hearing; all testimony filed by either party to be used at the said hearing must be taken and transmitted in accordance with the rules of the office, which will be furnished on application.

The testimony in the case will be closed on the 13th of October next; depositions and other papers relied upon as testimony, must be filed in the office on or before the morning of that day; the arguments, if any, within ten days thereafter.

Ordered, also, that this notice be published in the "National Republican," Washington, D. C., and "Tribune," New York, N. Y., once a week for three successive weeks; the first of said publications to be at least sixty days previous to the day of hearing. D. P. HOLLOWAY,
Commissioner of Patents.

"NEW BOOKS." ANY OF OUR Readers who may require books on the subject of Gas-Light, Heat, Water, Sewerage, or other scientific matters, can be promptly supplied by addressing the Publisher of The AMERICAN GAS-LIGHT JOURNAL, No. 58 Liberty st., New York.

COAL-OIL & CANDLES.

THE LUTHER ATWOOD OIL COMPANY'S

DEODERIZED

ILLUMINATING OIL,

Unsurpassed by any KEROSENE manufactured. Is nearly COLORLESS, of a PLEASANT ODOR, and burns without smoke, or crusting the wick.

WARRANTED NON-EXPLOSIVE.

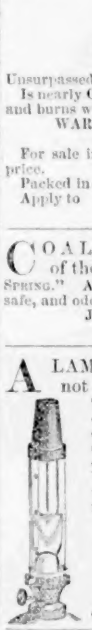
For sale in any quantity at a greatly reduced price.

Packed in cans and cases for foreign markets. Apply to U. TALLMAN,
34 Burling Slip, New York.

COAL OIL! COAL OIL!! of the celebrated brand of "SILVER SPRING." A superior burning oil, white, pure, safe, and odorless.

J. S. STANTON, Manufacturer,
No. 132 Maiden Lane.

A LAMP CHIMNEY THAT WILL not break.—Made for the million.



The patent Mica Chimneys for coal-oil Lamps possess many advantages over the glass chimneys. They do not break from the heat, falling, cleaning, or any ordinary usage. When one is purchased it will last, with care, as long as the lamp. They fit all the burners now in use.

AMOS HORNING,

Agent for Manufacturer,
No. 321 North Second st.,
Philadelphia.

N. B.—Coal-Oil Lamps and Coal-Oil at low rates.

PATENTED OCT. 8, 1861.

Dithridge's Patent

OVAL LAMP CHIMNIES,

for Coal-Oil burners. Manufactured of

XX FLINT GLASS.

These chimnies are intended for the flat flame which, heating all parts of the glass equally, does not expose it to cracking.

E. D. DITHRIDGE,
Fort PittGlass Works,
Pittsburg, Pa.

THE LOVERS' LAMPS.—Price Five Shillings ($1.25) each. To supersede Candles and Night Lights. No Dressing or Trimming required.

EDMUND SPILLER,
Patentee,
98 HOLBORN-HILL, LONDON.
Post-Office orders attended to.

Ambrose's
PATENT
COAL-OIL,
NO-CHIMNEY
BURNER,

For Portable LAMPS, LANTERNS, Etc. Requires no Chimney.

Address,
J. E. AMBROSE,
249 Pearl st.,
New York, or
45 Newark Av.,
Jersey City, N. J.

AGENTS.—TO ALL WHO USE Candles.—The Candle Lamp just out. Safety and economy in light. No excuse for using explosive fluids. No dropping of tallow on carpets. The Candle Lamp will be sent free on receipt of 25 cents. Agents, male and female, can make a larger profit, and find a quicker sale for the Candle Lamp, than any article yet offered to the public. Send red stamp for illustrated circular.

WM. SUMNER, 208 Broadway, (room No. 10,) N. Y. city.

GAS THERMOMETERS FOR ascertaining and regulating the temperature of the gas while passing through the purifiers into the station meters. For sale at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

THE

STERLING GAS-REGULATOR,

Improves the Light and Saves a Large Per Centage of Gas.

MANUFACTURED BY THE

WHEELER & WILSON SEWING MACHINE COMPANY.

It is well known that Printers require the best and most brilliant light. In proof of the superiority of these Machines over all others, the following New York establishments are using them, and testify to their excellence:—New York Times, New York Herald, New York World, New York Tribune, New York Sun, Journal of Commerce, Courier & Enquirer, Evening Post, The Zietung, Dispatch, Leader, Scientific American, Advertiser and Spectator, Independent, Daily News, Harper's Monthly and Weekly, Transcript, Mercury, Atlas, Life Illustrated, Albion, Spirit of the Times, AMERICAN GAS-LIGHT JOURNAL, Christian Enquirer, Churchman, Church Journal, Christian Advocate, Christian Ambassador, Christian Intelligencer, Observer, Sunday Times, Sunday Courier.

By order of the New York and Brooklyn Common Councils, these Regulators are now used in the City Halls, Police Stations, Markets, and other Public Buildings in both cities.

They are Warranted by the

WHEELER & WILSON SEWING-MACHINE CO.,

505 BROADWAY, NEW YORK,

To keep in order, and always maintain the pressure of the Gas at the lowest point for a brilliant light and economical combustion. They are so constructed that *under no circumstances can the Mercury get into the Meters, or in any way injure them.*

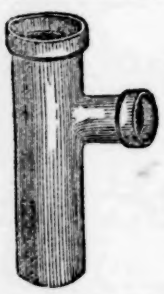
WARREN'S PATENT WATER & ALARM GAUGE

For Protecting the Flues and Preventing Steam-Boiler Explosions.

This is a reliable High and Low Water Detector, arranged so as to render it one of the best Water Gauges ever attached to a Steam-Boiler; always presenting before the Engineer at sight the exact height of the water, and if, by oversight or by sudden leakage, the water gets low in the boiler, it will cause an alarm before the water gets below the flues, thereby preventing an explosion. This Gauge can be made to alarm at any point desired as a High Water Detector, thereby preventing the water from getting to that height as to be forced into the cylinder of the engine, often causing serious accidents. Thus it is a High as well as a Low water Detector. For sale by

WARREN & BANKS,

159 Centre st., corner of Canal st., New York, Where a Gauge is constantly in operation.



GAS, STEAM, SMOKE,

PURE WATER & SOIL PIPE,

FROM

JOSEPH CLIFF

Wortley Fire-Brick Works, Leeds, England.

T. W. PARMELE, Agt.,

No. 4 Irving Place, N. Y.

JOHN RUSSELL & CO.,

PATENT TUBE MAKERS,

THE OLD TUBE WORKS, WEDNESBURY, AND THE ALMA WORKS, WALSAL, STAFFORDSHIRE,

69 UPPER THAMES ST., & 5 CHARLES ST., SOHO, LONDON;

AND 35 GRANBY ROW, MANCHESTER, ENGLAND.

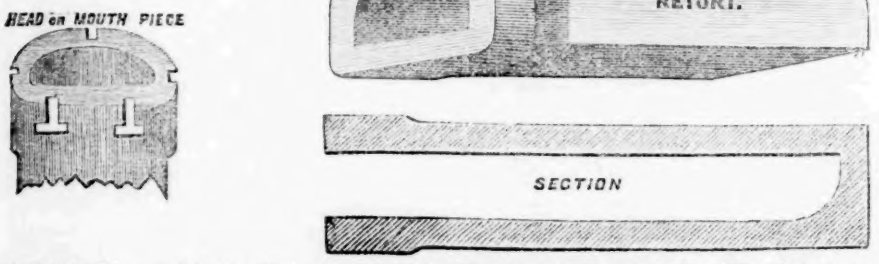
The original Manufacturers of WROUGHT-IRON GAS TUBES, and the Inventors of the Lap-welded Tubes for Locomotive and Marine Boilers. All kinds of TUBES and FITTINGS, whether for Gas, Steam, or Water. Galvanized and Composition Tubes. Chandeliers, and every kind of Brass work for Gas and Steam.

STOCKS, DIES, AND TAPS OF ALL SIZES. CAST-IRON PIPE AND GAS-METERS.

All Goods Warranted.

KING BROTHERS,

STOURBRIDGE, ENGLAND, FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for Burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them

Free from Cracks and Correct in Form.

By great care in Manufacturing, combined with the advantages in Burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

RETORT OVENS, FIRE-BRICKS, GUARDS, SADDLES, RABITTED BURS, FLUES, AND QUARRIES, ARE ALL MANUFACTURED OF THE SAME QUALITY OF CLAY.

EVERY RETORT AND BRICK IS BRANDED "KING BROTHERS, STOURBRIDGE."

Apply to E. W. BARSTOW, 83 Maiden Lane, New York, where samples can be seen.

HARRIS & PEARSON,

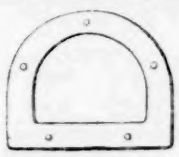
PROPRIETORS OF

Best Glass-House Pot & Crucible Clay.

Manufacturers of Fire-Bricks, Gas-Retorts, and Glass-House Furnace-Bricks of every description.

AMBLECOTE FIRE-CLAY AND BRICK WORKS, STOURBRIDGE, ENGLAND.

COWEN'S PATENT FIRE-CLAY RETORTS.



JOSEPH COWEN & CO.,

BLAYDON BURN, near Newcastle-on-Tyne, England,

Have always been, and are still, the most extensive manufacturers of FIRE-CLAY RETORTS in the United Kingdom, and were the only parties to whom a Prize Medal was awarded at the Great Exhibition, in London, 1851, for

"GAS RETORTS, AND OTHER OBJECTS IN FIRE-CLAY."

J. C. & CO. make Fire-Clay Retorts of all shapes and dimensions, and to fit existing mouth-pieces.

Orders for FIRE-CLAY RETORTS, TILES, BEARERS, and other articles in Fire-Clay, receive immediate attention, and are promptly executed at their Works, as above. Drawings of Settings adapted for Cowen's Patent Fire-Clay Retorts supplied.

AGENTS, MESSRS. MEAD & BELL,

13 CLIFF STREET, NEW YORK.

N. B.—J. C. & CO.'S RETORTS are well adapted for small Gas-Works, as they can be used without an Exhauster.

WHERE GAS-WORKS AND WATER-WORKS ARE WANTED.

We are now publishing regularly the names of the thirty thousand post-towns in the United States, so that builders of gas-works and water-works, and the various manufacturers, may see where are new openings for business. And as each post-master will receive several copies of the AMERICAN GAS-LIGHT JOURNAL, for distribution, the number thus circulated will probably exceed *Three Million Copies. What a chance for advertisers!*

POST-OFFICE TOWNS IN THE UNITED STATES,

ARRANGED BY STATES AND COUNTIES,

Showing where Gas-Works and Water-Works are Wanted.

WISCONSIN.

54 Counties, 916 Towns, 8 Gas-Works, 2 Water-Works.

(*Concluded from page* 115.)

Oconto County.

Little Suamico,	Menekaune,	Peshtigo,
Marrinette,	Oconto,	Stiles.
	Pensuekie,	

Outagamie County.

Appleton,	Keshena,	Shaw-wu-no,
Freedom,	Lansing,	Shiocton,
Greenville,	Little Chute,	Stephensville,
Hortonville,	Medina,	Sugar Bush,
Kaukauna,		Wakefield.

Ozaukee County.

Belgium,	Grafton,	Ozaukee,
Cedarburgh,	Horris Corners,	Saukville,
Fredonia,	Mequon River,	Ulao.

Pepin County.

Cippewa,	Luna,	Pepin,
Durand,		Stockholm.

Pierce County.

Bay City,	El Paso,	*Prescott*, (c. h.,)
Beldenville,	Maiden Rock,	Rush River,
Big River,	Martell,	River Falls,
Clifton Mills,	Perrytown,	Trenton,
Diamond Bluff,	Pleasant View,	Trim Belle.

Polk County.

Cedar Valley,	Falls of St. Croix,	Stirling.
	Osceola Mills,	

Portage County.

Alamond,	Eau Pleine,	*Plover*, (c. h.,)
Amherst,	Emily,	Randall,
Badger,	Linwood,	Saratoga,
Buena Vista,	Lone Pine,	Stevens Point,
Centralia,	Madely,	Stockton.
	Mohawk,	

Racine County.

Burlington,	North Cape,	Sylvania,
Caldwell Prairie,	Norway,	Trowbridge,
Caledonia,	Pan Yan,	Union Church,
Caledonia Centre,	Prairie,	Union Grove,
Ives' Grove,	Racine,	Waterford,
Kansasville,	Raymond,	Whitesville,
Mount Pleasant,	Rochester,	Yorkville.
	South Bristol,	

Richland County.

Aken,	Henrietta,	Richland Centre,
Ashland,	Hoosier,	Richland City,
Boaz,	Ithaca,	Ripley,
Buckeye,	Lone Rock,	Rockbridge,
Cazenovia,	Lost Mountain,	Sextonville,
Cincinnati,	Loyd,	Sylvan,
East Henrietta,	Milan,	Viola,
Excelsior,	Mill Creek,	West Branch,
Fancy Creek,	Neptune,	Woodstock,
Forest,	Orion,	Yuba.
	Port Andrew,	

Rock County.

Afton,	Fairfield,	Milton,
Alvaretta,	Footville,	Ogden,
Avon,	Fulton,	Orfordville,
Beloit,	Hanover,	Osborn,
Center,	Janesville,	Rock Prairie,
Cooksville,	Johnstown,	Shopiere,
Edgerton,	Johnstown Centre,	Spring Valley,
Emerald Grove,	Leyden,	Tiffany,
Evansville,	Lima Centre,	Union.
	Magnolia,	

Sauk County.

Baraboo, (c. h.,)	Giddings,	Oaks,
Bear Valley,	Humboldt,	Prairie Du Sac,
Bluff,	Ironton,	Reedsburg,
Buchanan,	Lavalle,	Russel's Corners,
Cassell Prairie,	Lime Ridge,	Sandusky,
Delona,	Loganville,	Sauk City,
Delton,	Merrimack,	Spring Green,
Garrison,	Newport,	Wilson's Creek.

Shawano County.

Embarrass,	Keshena,	Lamote.

Sheboygan County.

Adell,	Greenbush,	Rathbun,
Beech Wood,	Hingham,	Russell,
Cascade,	Howard's Grove,	Scott,
Cedar Grove,	Onion River,	*Sheboygan*, (c. h.,)
Edwards,	Our Town,	Sheboygan Falls,
Elkhart,	Plymouth,	Wheat Valley,
Gibbville,		Winooski.

St. Croix County.

Bonchea,	Hudson,	New Centerville,
Brookville,	Huntingdon,	New Richmond,
Glenmont,	Kinnick Kinnick,	Rushville,
Hammond,		Somerset.

Trempeleau County.

Arcadia,	South Bend,	Sumner,
Galesville,		Trempeleau.

Walworth County.

Adams,	Bloomfield,	Densmore's Mills,
Allen's Grove,	Darien,	East Troy,
Big Foot Prairie,	Delavan,	*Elk Horn*, (c. h.,)
Geneva,	Millard,	Tirade,
Geneva Bay,	Richmond,	Troy,
Grove,	Sharon,	Troy Centre,
Heart Prairie,	South Grove,	Troy Lakes,
Honey Creek,	Springfield,	Vienna,
La Grange,	Spring Prairie,	Walworth,
Little Prairie,	State Line,	Westville,
Lyons,	Sugar Creek,	White Water.

Washington County.

Addison,	Hartford,	Richfield,
Aurora,	Kewaskum,	Schleisingerville,
Barton,	Mecker.	Stantsville,
Boltonville,	Myra,	Station,
Cedar Creek,	Nenno,	Toland's Prairie,
Fillmore,	Newburgh,	West Wend,
Freistadt,		Young Hickory.

Waukesha County.

Big Bend,	Lannon Springs,	Oconomowock,
Brookfield Centre,	Lisbon,	Ottawa,
Colebrook,	Mapleton,	Pewaukee,
Delafield,	Marcy,	Pine Lake,
Dodge's Corners,	Menominee Falls,	Prospect Hill,
Dousman,	Merton,	South Genesee,
Duplainville,	Monches,	Stone Bank,
Eagle,	Monterey,	Summit,
Elm Grove,	Mukwonago,	Sussex,
Genesee,	Muskego Centre,	Vernon,
Hartland,	North Prairie Station,	Waterville,
Lake Five,		Waukesha.

Waupaca County.

Bear Creek,	Iola,	North Royalton,
Clintonville,	Lind,	Ogdensburgh,
Crystal Lake,	Little Wolf,	Readfield,
Evanswood,	Mukwa,	Rural,
Fremont,	New London,	Scandinavia,
Gill's Landing,	Northern,	Waupaca.
	Northport,	

Waushara County.

Adario,	East Oasis,	Plainfield,
Blurton,	Elma,	Ravine,
Cedar Lake,	Hancock,	Sacramento,
Cole Brook,	Howe's Corners,	Saxeville,
Coloma,	Lincoln,	Silver Lake,
Corfu,	Mount Morris,	Spring Lake,
Dakota,	Oasis,	Spring Water,
Dodge's Corners,	Pine River,	Wautoma,
East Coloma,	Poy Sippi,	Willow Creek,

Winnebago County.

Algoma,	Groveland,	Poygam,
Black Wolf,	Koro,	Rat River,
Butte des Morts,	Menasha,	Vinland,
Campbell,	Neenah,	Waukau,
Clairville,	Nepeuskun,	Weelaunee,
Delhi,	Nekama,	Weynauweya,
Eureka,	Omro,	Winchester,
Fish's Corners,	Oshkosh,	Winneconne.

Wood County.

Centralia,	Frenchtown,	Horn River,
Dexterville,	Grand River,	Nasonville.
	Hemlock,	

WATER-WORKS OF AMERICA.

CHICAGO, ILL.

Messrs. Blaney & Mariner's Report, with their Analysis of Different Samples of the Water Supplied to Chicago.

CHICAGO ASSAY OFFICE,
Feb. 8, 1862.

To the Board of Public Work of the City of Chicago:

Gentlemen,—In the accompanying tables we present the results of our analyzation of twenty-three samples of water, collected and placed in our hands by E. S. Chesbrough, Esq. They were contained in glass demi-johns, sealed and numbered. The localities, from which they were obtained, were not given, and are unknown to us. The samples were received at different times, from the 18th of April to the 20th of November last.

Table A shows the substances detected in the waters, and gives, in grains, the quantities of each in one gallon.* It presents the direct results of the analyzation from which those given in table B are derived by calculation.

Table B shows the manner in which the substances enumerated in table A, are combined together among themselves; the compounds thus formed, and the quantity, in grains, of each in one gallon. It may not be superfluous here to state, that most of the substances mentioned in table A, do not exist in the waters themselves in the free, or separate, state in which they are there presented; on the contrary, they are combined with one another—the sulphuric acid, for instance, with a portion of the lime, forming sulphate of lime, and the rest of the lime, with carbonic acid, forming carbonate of lime. In like manner are formed carbonate of magnesia, chloride of sodium, &c., in the quantities and in the proportions set forth in table B.

These results show the presence in the waters of four distinct classes of substances, namely:

I. SOLID MINERAL MATTER, { Sulphate of lime. Carbonate of lime. Carbonate of magnesia. Chloride of sodium. Protoxide of iron, alumina [and phosphates. Silica. Soda.

II. SOLID ORGANIC MATTER, { Animal. Vegetable.

III. GASEOUS MATTER, { Sulphuretted hydrogen. Carbonic Acid Gas. Oxygen. Nitrogen.

IV. UNDISSOLVED OR SEDIMENTARY MATTER, { Organic. Mineral.

Proceeding to treat of these classes in order, we have *First, Solid Mineral Substances.*—These are the most abundant, and have a practical interest on account of their relation to animal and vegetable life, domestic economy, manufactures, the generation of steam, &c., &c. They are found, in greater or less quantity, in all natural waters. Rain water, however, if collected at a distance from habitations or the sea, does not contain them in any sensible quantity. Natural waters, arranged according to their general purity, will appear in the following order:

1. River water.
2. Lake, or Pond, water.
3. Spring water.
4. Mineral spring water.
5. Sea water.
6. Lake water from lakes having no outlet.

The purest known river water is that of the river Loka in Sweden, which contains only 1.25 of a grain of solid matter in a gallon. Other rivers contain greater quantities, as the

Croton River, (N. Y.,) 4.160.
Schuylkill, (Phila.,) 4.261.

The rivers of France contain from 4 to 32 grains in a gallon, averaging 16; those of England from 6½ to 19½, averaging 14½.

Lakes contain, generally, more dissolved matter than the rivers which flow into them, owing to the extensive surface and consequent evaporation and concentration of their waters. Lakes, however, though containing more solid matter than the average of the rivers running into them, may yet contain less than some one of them. This occurs when a river, rendered impure by local or other causes, is too small to modify the lake into which it flows.

These mineral constituents, when of the ordinary character, and not in excess, are not, by any means, to be regarded as impurities so far as the use of the water as a beverage is concerned. These earthy matters are, in fact, essential to the water as a beverage. Their total absence, as in distilled water, would render it unfit for such use. Some waters, in constant use for drinking purposes, contain as much as sixty grains to the gallon, and even more; but, generally, in the waters of average purity used for domestic purposes, there are not present more than from 17 to 25 grains of mineral matter to the gallon.

Table B shows that the mineral matter, in the waters examined, varies, in quantity, from 8 grains in No. 16 to 21¾ in No. 22. In its composition, the mineral matter is of the ordinary character, the only noticeable peculiarity being the unusually large proportion of silica which it contains.

Domestic Economy is also seriously affected by the quantity and quality of these mineral constituents. Culinary operations, for example, are in that way affected, sometimes injuriously, sometimes beneficially. On the whole, however, their presence, in this case, is decidedly objectionable, as their absence can be remedied by a proper addition to the water, while their presence, when injurious, cannot so easily be avoided. If we wish to soften meats or vegetables and obtain their juices or soluble principles, as in the boiling of peas and beans, and the preparation of tea, coffee, and soups, the best water for the purpose is that which is the softest or purest. Such waters have more solvent power than any other, and are therefore better adapted for such purposes. If, on the other hand, we wish merely to *cook* the substance without separating any of its constituents, the best water is that which is hard and contains dissolved mineral matter. To communicate this quality of hardness to soft water, salt is frequently added.

In relation to domestic economy, these mineral substances are considered the most objectionable in the *laundry*. Water is said to be hard or soft according as it does, or does not, produce decomposition or curdling with soap. This effect is due to the presence of lime and magnesia compounds in the water which unite

*Throughout the Report and tables, the U. S. standard gallon, (or wine gallon,) of 231 cubic inches, is referred to. It contains 58,318⅔ grains of water.

with the fat in the soap, producing insoluble substances which separate from the water and cause the appearance called curdling. In this way a constant waste is occasioned, corresponding to the quantity and quality of the mineral matter in the water. Hence water that is palatable, and apparently quite wholesome, may yet contain so much mineral matter in solution, as to be unfit for laundry or culinary purposes.

Incrustation presents another difficulty, occasioned by the presence of mineral matter in the water. The carbonates of lime and magnesia are held in solution by the free carbonic acid gas contained in the water, and are precipitated when it is boiled and the gas driven off. Sulphate of lime, on the contrary, does not require the aid of carbonic acid gas for solution, but is precipitated in consequence of evaporation, and its limited solubility in boiling water. The silica, alumina, and oxide of iron are also deposited during the escape of carbonic acid gas and the evaporation of the water. It is a well-known property of these earthy deposits, that they attach themselves to the sides of the vessels in which the water is boiled, in the form of a solid, hard incrustation. Even for domestic purposes this incrustation is very inconvenient, as it cannot be removed in cleaning, (at least from narrow-mouthed vessels,) and every time the vessels are used a fresh layer is deposited, which adds to the thickness of the former crust. In boilers this circumstance is doubly inconvenient—first, because the tendency towards the formation of this deposit is much facilitated by the evaporation; and, secondly, because its injurious effects are much more extensive and dangerous. In a steam-boiler, from one period of cleansing to the next, the total amount of the fixed mineral ingredients, contained in the quantity of water supplied to it, remains, while the pure water and the gases alone are evolved. If 1,000 gallons of water, like No. 16, be evaporated from a boiler in 24 hours, a residue would be left of one pound. But if an equal quantity of water, like No. 22, had been evaporated, the amount deposited would have been *three* pounds. In either case a portion of the solid matter would be mechanically expelled with the steam, leaving, however, by far the greater portion to settle down as an incrustation, which very soon becomes burnt in. In a short time the wrought iron of the boiler will not communicate the heat it receives from the fire directly to the water in its interior, but to the badly conducting solid incrustation, and the water will consequently be less quickly heated. It readily happens, under these circumstances, that a portion of the iron, notwithstanding the boiler is well supplied with water, becomes red-hot, and should a part of the incrustation become detached, the water would come into sudden contact with the red-hot iron, giving rise to the instantaneous formation of an excessive amount of steam, and an explosion may ensue. In steamboats where river water, containing, in addition to the salts in solution, a large quantity of suspended solid matter, or sea-water is employed for feeding the boiler, the evil is very much increased.

Secondly, Organic Substances.—These are the most objectionable impurities to be found in ordinary waters. Any ordinary water, containing less than 15 grains of mineral matter in a gallon, may be regarded as comparatively pure, and may be employed for domestic purposes, provided it does not contain a large proportion of organic matter. By referring to table B, it will be observed that the waters marked 20, 21, 22, 23, contain, respectively, $4\frac{1}{2}$, $4\frac{1}{5}$, $4\frac{1}{2}$, $4\frac{2}{3}$ grains of organic matter to the gallon. The presence of this quantity of organic matter in these waters renders them unfit for domestic use, unless purified, as a considerable proportion of their organic matter is of animal origin.

These organic substances, in most cases, are of vegetable origin, and are derived from the solvent action of rain and spring waters upon the vegetable substances through which they percolate in passing from their various sources into lakes and rivers. Hence the waters of lakes and rivers contain more of these impurities than those of springs. In populous districts substances of animal origin likewise find their way into the waters of lakes, rivers, ponds, and wells. It often happens that, in the neighborhood of dwellings and farm-yards, and especially in towns, the water of wells becomes very impure and even unwholesome to drink. The rains that fall upon the filth that accumulates in towns, wash out these soluble substances it contains, carry them into the soil, and through this, by degrees, to the wells by which the wants of the inhabitants are supplied. This has often been productive of serious and fatal diseases. It shows, therefore, the propriety of preventing, as far as possible, the accumulation of refuse, and, where such accumulation is unavoidable, of placing it at the greatest distance from wells which yield water for daily use. And especially it shows the necessity of bringing water from a distance for the supply of large cities.

In the neighborhood of grave-yards water may become adulterated with undesirable admixtures. The water of a well, close to an old church-yard, has been found to contain as much as 100 grains of solid matter to the gallon, more than one-half consisting of *nitrates*, traceable to the neighboring grave-yard. Such compounds are generally produced where animal matters decay in porous soils.

The following table exhibits the proportion of organic matter (also mineral matter) found in certain well-known English and American waters, arranged in the order of their purity in reference to organic matter:

	Croton hydrant water, N. York.	Schuylkill water, Philadelphia.	Chicago water—No. 16.	Fresh Pond water, Cambridge, Massachusetts.	Cochituate water, Boston.	Mean of 4 English Rivers.	Chicago water—No. 23.	Thames water at London Bridge.
Mineral Matter	3.70	4.25	6.74	5.00	1.69	14.49	16.06	17.53
Organic Matter	.46	1.24	1.27	1.85	1.43	2.15	4.69	5.83
Total Solid Matter	4.16	5.49	8.01	6.85	3.12	16.64	20.75	23.36

Thirdly, Gaseous Substances.—These were found to be oxygen, hydrogen, carbonic acid gas, and sulphuretted hydrogen. The first three were in all the samples of water examined. They are, indeed, in nearly all natural waters. Traces of sulphuretted hydrogen were detected in Nos. 20, 21, 22, and 23, generated from the decomposition of the animal matter which they contained.

Fourthly, Sedimentary Substances.—All the samples contained sedimentary matter. The respective amounts appear in table B.

All which is respectfully submitted,

BLANEY & MARINER, Chemists.

The following is a description of the points from which water was taken for analysis by Messrs. Blaney and Marriner:

DATE	NO. OF SPECIMEN	WHENCE TAKEN.	REMARKS.
1861.			
April 17	No. 1	1,000 feet from Cleaverville	Surface of Lake.
"	" 2	1 mile out from Cleaverville	" "
"	" 3	1 mile out from Cleaverville	Bottom of Lake.
"	" 4	1 mile out from Engine-House	Surface of Lake.
"	" 5	1 mile out from Engine-House	" "
"	" 6	1,000 feet out from Engine-House	" "
"	" 7	Near the Light-House	" "
"	" 8	Near Clark Street Bridge	When the above specimens were taken the lake was somewhat agitated by wind, and here appeared to be a dark belt extending northwardly from the mouth of the river.

The following specimens were collected at the Engine-House by Mr. Cregier:

DATE.	NO. OF SPECIMEN	WHENCE TAKEN.	REMARKS.
1861.			
May 20	No. 9	Engine-House	
June 3	" 10	Engine-House	
Aug.	" 11	From "dead ends" north of pumping works	
"	" 12	From "dead ends" north of pumping works	
Sept. 20	" 13	300 feet from breakwater at Engine-House	Surface of Lake calm.
"	" 14	1 mile from breakwater at Engine-House	Bottom of Lake wind N.E.rough.
"	" 15	1 mile from breakwater at Engine-House	Surface of Lake wind N. E. r'h.
"	" 16	2 miles from breakwater at Engine-House	Surface of Lake w'd N.E.very r'h
Oct. 18	" 17	Wallis' lower story tap, Lake near Clark street	A peculiar rain water app'rance
"	" 18	Inlet in basin at pumping works	
Oct. 22	" 19	From "dead end" on Milwaukee avenue	
Nov. 19	" 20	From South branch at Old St. Bridge	
"	" 21	From South branch at Van Buren Street Bridge	
"	" 22	From river at Clark St. Bridge.	
"	" 23	From North branch at Chicago Avenue Bridge	

INCREASE IN THE CONSUMPTION OF GAS IN PHILADELPHIA.—The quantity of gas made and consumed at the Philadelphia Gas-Works, between January 1st, 1862, and October 1st, 1862, was over 433,000,000 cubic feet, being 12,000,000 feet more than was made during a corresponding period of the year 1861.

TABLE A.

No. OF WATER	1	2	3	4	5	6	7	8	9	10	11	12
Organic Matter	2.8794	1.7171	1.9180	1.6917	1.7435	2.0688	1.9280	2.2521	2.0086	1.9543	1.6111	1.7707
Mineral Matter	10.5771	10.1285	8.7965	7.4212	7.3093	7.5409	7.9966	8.4502	7.3582	9.8851	8.7825	9.0782
Total Solid Matter	13.4565	11.8456	10.7145	9.1129	9.0528	9.6097	9.9246	10.7023	9.3521	11.8394	10.3936	10.8489
Sulphuric Acid	.3596	.3101	.1898	.1969	.1713	.1744	.1666	.2083	.1700	.3518	.2199	.2295
Sodium and Potassium	.2432	.2311	.2088	.2472	.2495	.3734	.3867	.2778	.2259	.2226	.1978	.3077
Chlorine	.0754	.0372	.1534	.1398	.0420	.0971	.0250	.0909	.1089	.0596	.0883	.0862
Silica	4.1445	4.0756	2.6665	.9536	1.0724	1.4350	1.6263	1.5091	1.2606	1.4010	.9381	1.5291
Lime	2.5892	2.3364	2.2867	2.3947	2.1185	2.5676	2.2960	2.4148	2.5413	2.9055	3.1848	2.8252
Magnesia	.5887	.6311	.7684	.7854	.7730	.7283	.9289	.9854	.7124	.8460	.7437	.9505
Per-Oxide of Iron and Alumina and Phosphates	.4197	.1327	.3086	.1636	.8039	.0231	.0185	.1420	.0988	.0895	.1157	.4552
Carbonic Acid (combined)	2.4619	2.3365	2.5099	2.5094	2.3928	2.6963	2.7006	2.8312	2.6612	2.9895	3.1727	2.0395

No. OF WATER	13	14	15	16	17	18	19	20	21	22	23
Organic Matter	1.4158	1.4643	1.9909	1.2727	2.2785	2.4467	1.7956	4.3422	4 1247	4.5965	4.6941
Mineral Matter	8.3729	8.5318	8.1495	5.9503	8.1398	9.2461	7.4315	15.2823	17.2629	18.0115	14.7507
Total Solid Matter	9.7887	9.9971	10.1404	7.2230	10.4183	11.6928	9.2271	19.6245	21.3906	22.6080	19.4448
Sulphuric Acid	.3040	Trace	.2561	.3024	.4397	.4660	.1960	.3703	1.3131	1.2282	.7190
Sodium and Potassium	.1501	.2191	.2129	.1389	.3968	.3456	.2393	1.1295	1.2581	1.3517	1.0651
Chlorine	.0375	.0642	.1529	.2083	.0298	.2392	.1134	.3796	.0214	.4209	.1449
Silica	2.5551	2.8681	1.7930	.3512	1.5507	2.6493	1.5430	2.0701	2.9764	6.3001	3.3992
Lime	2.8176	2.7882	3.0053	2.5796	2.2682	2.1124	1.5106	3.6368	4.3759	3.3653	3.6588
Magnesia	.3472	.5848	.5956	.6789	.6589	.8517	.7052	1.7096	1.9010	.8979	1.7544
Per-Oxide of Iron and Alumina and Phosphates	.1173	.0694	.0197	.0756	.2376	.1389	.1944	.3450	.3561	.3009	.6342
Carbonic Acid (combined)	2.4160	2.8023	2.8541	2.5043	2.2413	2.3096	1.8394	4.4728	4.7385	2.9239	4.3421

TABLE B.

No. OF WATER	1	2	3	4	5	6	7	8	9	10	11	12
Sulphate of Lime	.6113	.5272	.3227	.3332	.2912	.2962	.2832	.3541	.2890	.5081	.3738	.3901
Carbonate of Lime	4.1731	3.7843	3.8460	3.9312	3.5689	4.3669	3.8917	4.0518	4.8255	4.7485	5.4123	4.6352
Carbonate of Magnesia	1.2150	1.3026	1.5861	1.6210	1.5956	1.5032	1.9172	2.0838	1.4704	1 7462	1.5350	1.9618
Silica	4.1445	4.0756	2.6665	.9336	1.0724	1.4350	1.6263	1.5091	1.2606	1.4010	.9381	1.5291
Per-Oxide of Iron, Alumina and Phosphates	.4197	.1327	.3086	.1636	.8039	.0231	.0185	.1420	.0988	.0895	.1157	.4552
Chlorides of Sodium and Potassium	.1242	.0613	.2528	.2304	.0692	.0600	.0412	.1498	.1794	.0982	.1373	.1421
Organic Matter	2.8794	1.7171	1.9180	1.6917	1.7435	2.0688	1.9280	2.2521	2.0086	1.9543	1.6111	1.7707
Soda (combined with Organic Matter)	.2621	.2792	.1476	.2112	.2917	.4188	.4997	.2953	.2230	.2482	.1940	.3396
Total Solid Matter	13.8293	11.8800	11.0483	9.1359	9.4364	10.1723	10.2058	10.7880	9.8553	10.8840	10.3173	11.2238
Free Carbonic Acid (c. in.)	9.8243	12.1632	8.4235	10.0004	8.1298	8.9394	7.1503	5.7201	5.7231	6.2491	10.5524	12.6058
Sedimentary Matter	4.9633	2.8725	1.7333	3.1055	3.2244	3.2403	4.4372	2.9404	....	....	....	....

No. OF WATER	13	14	15	16	17	18	19	20	21	22	23
Sulphate of Lime	.5168	Trace	.4354	.5141	.7475	.7922	.3332	.6295	2.2323	2.0879	1.2228
Carbonate of Lime	4.6514	4.9789	5.0464	4.0498	3.5007	3.1896	2.4525	6.0314	6.1726	4.4743	5.6259
Carbonate of Magnesia	.7166	1.1863	1.2293	1.4013	1.3599	1.7580	1.4554	3.5167	3.9236	1.8525	3.6211
Silica	2.5552	2.7681	1.7930	.3512	1.5507	2.6493	1.5430	2.0701	2.9764	6.3001	3.3992
Per-Oxide of Iron, Alumina and Phosphates	.1173	.0694	.0197	.0756	.2376	.1389	.1944	.3450	.3561	.3009	.6342
Chlorides of Sodium and Potassium	.0618	.1058	.2520	.3433	.0491	.3942	.1869	.6256	.0838	.6936	.2388
Organic Matter	1.4158	1.4643	1.9909	1.2727	2.2785	2.4467	1.7956	4.3422	4.1247	4.5965	4.6941
Soda (combined with Organic Matter)	.1397	.2394	.1535	.0053	.5088	.2571	.2236	1.1917	1.6782	1.4554	1.3100
Total Solid Matter	10.1746	10.8132	10.9202	8.0133	10.2828	11.6260	8.1846	18.7422	21.4992	21.7612	20.7456
Free Carbonic Acid (c. in.)	7.3262	8.0594	8.7926	7.4115	10.4251	10.5067	12.3286	14.1765	24.7356	26.3973	22.2541
Sedimentary Matter	.3564	.2973	.3544	.1882	.8023	.6789	1.8515	2.0047	2.8435	5.0659	4 3336

REMARKS.—No. 1 is colored by organic matter; so also are Nos. 8, 20 21, 22, and 23. Nos. 20, 21, 22, and 23, on standing, become fetid and turbid, from the decomposition of animal matter, but finally purified themselves by spontaneous fermentation, becoming clear and odorless, and not unpalatable.

THE COLOR PRODUCTS OF COAL—MAUVE AND MAGENTA.

A Lecture delivered before the Royal Institution of England.

By A. W. Hoffmann, L. L. D., F. R. S.

(*Continued from page* 117.)

But it is time for us to return to the point from which we started. What has the recognition of our types to do with the distillation of coal? In what manner do they explain the formation of the variety of substances generated in this process? In coal we have the elements of the three types of matter, and we find that hydrogen, water, and ammonia are in fact produced to a very appreciable extent during its distillation. The quantity of free hydrogen is generally small; moreover, mixed as it is with the carbonated hydrogens of coal-gas, its presence among the products of distillation of coal is not easily demonstrated by experiment. Water and ammonia, on the other hand, are abundantly generated, and nothing is easier than to exhibit their production. In fact, the coal-tar oil which we have produced in our distillation experiment, is covered, as you observe, with a layer of water, and the application of test-papers to the latter shows that it contains a large amount of ammonia. Now, consider that our types are generated from coal in the presence of large quantities of carbon and hydrogen, two elements which, in proportions varying to an almost unlimited extent, may aggregate under the influence of heat to compound atoms similar to ethyl and phenyl; remember, moreover, that these atoms are capable of displacing, partly or entirely, the hydrogen of our types, and you will realize without difficulty the number of compounds which may be formed by the distillation of coal; I say which may be formed, for the diagram which I have exhibited to you enumerates only the bodies which have actually been obtained; but every day brings forth new substances. It is obvious that the nature of the compound atoms generated must, in a measure, depend upon the composition of the coal distilled. The composition of coal, however, varies between very considerable limits. In the subjoined diagram I give you a synopsis of the results obtained in the analysis of several specimens of coal.

ANALYSIS OF DIFFERENT COALS.

Locality of Coal.	100 Parts of Dry Coal.						
	Contain					Leave.	
	Carbon.	Hydrogen.	Nitrogen.	Sulphur.	Oxygen.	Ash.	Coke.
Anthracite, Wales	91.44	3.36	0.21	0.79	2.58	1.52	92.20
Anthracite, Wales	90.39	3.28	0.83	0.91	2.97	1.61	92.10
Caking Coal, Newcastle	81.41	5.83	2.05	0.75	7.90	2.67	66 70
Cannel Coal, Wigan	80.07	5.58	2.12	1.50	8 09	2.70	60.35
Coal, Wolverhampton	78.57	5 29	1.84	0.39	12.88	10.30	57.21
Wallsend, Elgin	76.09	5.22	1.41	1.53	5 05	10.70	58.40
St. Helens, Lancashire	75.80	5.21	1.92	0.90	11.80	5.17	65.50
Methill Brown Coal	65.96	7.78	0.96	0.75	9.23	15.32	
Bohemian Brown Coal	55.59	4.16	19.06			21.19	

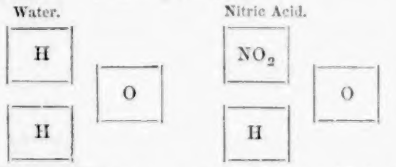
A glance at this diagram shows you that the carbon in the several specimens varies by more than 30 per cent., being 91.4 in Welsh anthracite, and 55.5 in Bohemian brown coal. Similar, though less marked discrepancies are perceptible in the other constituents. If you recollect, in addition, that the nature of the compound atoms generated in the distillation of coal must be influenced, moreover, by the temperature, which again oscillates between limits widely apart, you cannot fail to perceive that the destructive distillation of coal must be an almost inexhaustible source of new compounds.

The separation of the individual substances from the complex mixture called coal-tar oil appears, at the first glance, to present almost insurmountable obstacles. But the principles made use of for this purpose are very simple. The individual compounds contained in coal-tar oil may be separated in a great measure by distillation, their boiling points varying, as may be seen by a glance at the diagram, to a considerable extent. But additional means of purification offer themselves in the different deportments which these substances exhibit under the influence of chemical agents. I could not, perhaps, in this respect, bring under your notice a more instructive illustration than the behavior with acids and bases of the three coal-tar oil constituents, repeatedly quoted. Benzol, phenol, and analine may thus easily be separated. To demonstrate this point experimentally, two glass cylinders have been half filled with benzol, two others with phenol, and two further ones with aniline; a solution of litmus having, moreover, been added, each of the three substances is treated in one cylinder with acid, in the other with alkali. In the case of benzol, you observe the indifferent hydrocarbon, insoluble both in acid and alkali, floating colorless upon the colored liquid; phenol, being an acid water derivative, is not acted upon by the acid, but readily dissolves in the alkali; aniline, lastly, being a well-defined ammonia derivative, exhibits the converse deportment, resisting the action of the alkali, and forming a homogeneous solution with the acid.

Each of the three coal-tar oil constituents which I have mentioned, and of which you have characteristic specimens upon the lecture table, has received important applications in the arts and manufactures. Benzol is the most convenient solvent for caoutchouc; as an agent for removing oil and grease it has become an ordinary household article; phenol, when treated with nitric acid, yields us a beautiful yellow dye, called by chemists "carbazotic acid;" but the particular interest attached to phenol you will more immediately appreciate if I tell you that this compound presents the greatest analogy with creosote, a substance, I am afraid, but too well known to most of us—a considerable portion of the creosote of commerce being in fact simply phenol; aniline, lastly, is the source of mauve and magenta, and must therefore claim our attention more particularly this evening.

The amount of aniline which exists in coal-tar is very limited; a preparation from this source upon a sufficiently large scale could never be attempted. Fortunately, chemists are in the possession of a series of processes by which aniline may be produced in any quantity. Benzol, the phenylated hydrogen, may readily be converted into aniline, the phenylated ammonia.

Benzol is readily attacked by fuming nitric acid; it dissolves in it, producing a liquid of a deep red color. On addition of water this liquid deposits a heavy yellow oil, collecting at the bottom of the cylinder, perfectly different from benzol, which floats on the surface of the water. The re-action will be intelligible to you, if I remind you that nitric acid when referred to our types, must be viewed as a water derivative; it is water in which, for one of the elementary hydrogen atoms, there has been substituted a compound atom, consisting of nitrogen and oxygen.



Modern chemistry, you observe, returns to the conception of former ages, which, in the name aquafortis, appears to have anticipated in a measure our present notions.

When nitric acid acts on benzole, an interchange takes place between the elementary atom of the latter and the compound atom of the former, nitro-benzole, the heavy yellow liquid which we have produced, and water being formed:

Benzole. Nitric Acid. Nitro-benzole. Water.

$$(C_6H_5)H+\left.\begin{matrix}NO_2\\H\end{matrix}\right\}O=(C_6H_5)\quad(NO_2)+\left.\begin{matrix}H\\H\end{matrix}\right\}O$$

The transformation of benzole into nitro-benzole, discovered by Mitscherlich, is only a preparatory operation for the production of aniline. The method of converting nitro-benzole into aniline was discovered by Zinin. It consists in submitting nitro-benzole to the action of nascent hydrogen. Under the influence of this agent the compound atom NO_2, which in nitro-benzole is associated with phenyl, is decomposed; its oxygen is converted into water, the residue of nitrogen and phenyl assimilating the necessary quantity of hydrogen to form phenylated ammonia, or aniline,

Nitro-benzole. Hydrogen.

$$(C_6H_5)NOO+HH+HH+HH=$$

Aniline. Water.

$$\left.\begin{matrix}H\\H\end{matrix}\right\}O+\left.\begin{matrix}H\\H\end{matrix}\right\}O+\left.\begin{matrix}(C_6H_5)\\H\\H\end{matrix}\right\}N$$

The hydrogen necessary for this transformation may be furnished by numerous processes. The most convenient method for our purpose consists in submitting nitro-benzol to the action of metallic iron and acetic acid, a process first proposed by M. Béchamp. I mix the three bodies in a glass retort, and on application of a gentle heat you observe how immediately a most powerful re-action manifests itself. Let us hasten to connect the retort with a condenser; I have removed the gas burner from the retort; nevertheless the re-action continues, and a considerable quantity of water, covering an oily layer, has already accumulated in the receiver. The oily liquid is aniline. We recognize it at once by its peculiar deportment with a solution of chloride of lime. On pouring a single drop of our distillate into this beaker which contains a solution of chloride of lime, a splendid purple cloud is almost instantaneously diffused throughout the liquid. You perceive we are approaching our subject. The beautiful color which aniline strikes with a solution of chloride of lime has been long known. A solution of bleaching powder has always been used as a test for aniline; indeed, it was by this color re-action that the presence of our compound in coal-tar oil was first pointed out, a fact recorded in the name Kyanol (blue oil), originally given to aniline prepared from coal-tar. Several other oxidizing agents, chromic acid for instance, were likewise known to produce colored compounds from aniline; but all the colors thus obtained were of a highly ephemeral character. Observe how the purple cloud which I produced by means of chloride of lime has rapidly changed to a dingy reddish precipitate. It was Mr. W. Perkin who had first the happy idea of investigating the circumstances under which this beautiful purple might be prepared in a form permanent and applicable for the purposes of the dyer. He succeeded in isolating this color by submitting, under appropriately selected circumstances, aniline to the action of bichromate of potassium and sulphuric acid.

Here then you have, step by step, the development of this new and important branch of chemical industry.

Through the kindness of my friend Mr. Perkin, I am enabled to exhibit to you magnificent specimens of his aniline purple, or mauve, in the dry state and in solution. This brown lump, with the remarkable coppery luster, is mauve in the solid state; its extraordinary tinctorial powers will be appreciated, if I tell you that this beautiful violet colored solution contains not more than $\frac{1}{12}$th of a grain of mauve in one gallon of alcohol; you will also understand the considerable commercial value of this substance. Weight for weight, I am told by Mr. Perkin, this coloring matter, when pure, is sold at the price of metallic platinum.

Very little is known regarding the chemical nature of mauve; its composition is not yet made out, and, as a matter of course, the process by which it is formed from aniline remains as yet perfectly unexplained.

(*To be concluded.*)

Gas in Steamboats.—The Wallasey Commissioners, who have taken the lead in introducing the most perfect construction of ferry-boats that ever floated in the waters of the Mersey, seem determined to maintain their supremacy by availing themselves of every improvement. Their spledid new boat, the *Water Lily*, is now lighted by gas throughout. Instead of the dull, lurid flame produced by the oil, the signal lamps are brilliantly illuminated by a jet of the clearest gas-light. It does not require more than fifteen minutes to charge the receiver with sufficient gas for a night's supply. The apparatus is constructed to prevent all possibility of an explosion, and is not in any way affected by the motion of the boats. The cost of illumination will be at least 50 per cent. less than that of oil. The light only requires to be seen in order that its superiority may be appreciated; and, as in a small vessel the receiver is capable of containing a supply for three nights consumption, we may in a short time expect to have our steamers as they cross the Atlantic brilliantly lighted with gas.—*Liverpool Mercury.*

[The *Mercury* seems to regard the lighting of steamboats with gas as something new. It has been successfully used on our New York ferry-boats for several years.—Ed.]

PAPERS ON HYDRAULIC ENGINEERING.

By Samuel McElroy, C. E.

No. 2.—Distribution.

[From the Journal of the Franklin Institute.]

(*Continued from page* 101.)

Tuberculation.—In addition to the ordinary process of oxidation to which iron is subject cast-iron water-pipes are peculiarly liable to the production of internal accretions or tubercles, which restrict their calibre and discharge, and involve a chemical action destructive to the metal.

Of these evils, the former is the most important, since the gradual or partial loss of section, by irregular accretions, exerts an influence on the immediate usefulness of the pipes, which exceeds any question of cost in eventual replacement.

We have had frequent occasion to notice the rapid destruction of wrought-iron produced by sea water, in which particular veins and portions of the iron are the most rapidly injured, showing that the relative constituents of the special forging exposed, determine the rapidity of this action; and from frequent observation of like action on cast-iron water-pipes by fresh water, it is plain that this chemical process, though less formidable in degree in this case, is attributable to the same laws.

We are informed that in the mining pumps of the Pennsylvania coal region, it is not uncommon to have the lower pipes entirely destroyed in process of time, by a change into plumbago, from water action, and instances are on record in water-works experience, where the entire castings of the mains have been gradually transformed, retaining the form, but completely altering the substance, in certain local cases.

Observations were recorded in the *Edinburgh Philosophical Journal* in 1822, by Dr. J. Macculloch, on the production of black lead from cast-iron, under experiments with sea-water, porter, acids, &c., which have been recently extended by Dr. Crace Calvert, as noticed in the *London Engineer* of January, 1862, demonstrating the formation of plumbago from cubes of cast-iron.

From 1838 to 1843, in England, Mr. Robert Mallet made investigations of the operation of water on iron, in reference to water-pipes, of which the results are thus stated to the British Association for the Advancement of Science:

"He found that any sort of iron, cast or wrought, corrodes when exposed to the action of water holding air in combination, in one or other, or some combination of the following forms, viz: 1. *Uniformly*, or when the whole surface of the iron is covered uniformly with a coat of rust, requiring to be scraped off, and leaving a smooth, red surface after it. 2. *Uniformly, with plumbago*, where the surface, as being uniformly corroded, is found in some places covered with plumbagenous matter, leaving a piebald surface of red and black upon it. 3. *Locally*, or only rusted in some places, and free from rust in others. 4. *Locally pitted*, where the surface is left as in the last case, but the metal is found unequally removed to a greater or less depth. 5. *Tubercular*, where the whole of the rust which has taken place at every point of the specimen, has been transferred to one or more particular points of its surface, and has there formed large projecting tubercles, leaving the rest bare."

"The great elements of difference of corrosion as respects the iron itself, appear to be:

"1. The degree of *homogeneity* of substance of the metal, and especially of its surface.

"2. The degree of *density* of the metal, and state of its crystalline arrangement.

"3. The amount of *uncombined carbon* or suspended *graphite* contained in the iron; and therefore, that the more homogeneous,—the denser, harder, and closer grained, and the less graphitic—the smaller is the index of corrosion."

From examinations of the Cochituate mains, made by Prof. Horsford, in 1853, he expressed the opinion that—

"There has been *galvanic action*, arising in one class of cases from the contact of metals of unlike affinity for oxygen, and generally from a *want of homogeneity* of the iron: and to this, more than any other agency, is to be ascribed the rapid formation of accretions."—*Cochituate Water Report*, Jan., 1853.

While the law of this action is universal, and its effects are always to be anticipated, the degree of action is modified by the special conditions of any particular system of mains. Quality of water, rapidity of flow, temperature, and other circumstances, in connection with the special quality of the castings exposed, may accelerate or retard these formations; and our information as to their existence and effects, however well established as to the law, is somewhat defective in special records, partly because the action is hidden from sight, and partly because, when exposed, it is customary with water-works administrations, to conceal or deny the existence of defects.

Some of these effects may be thus briefly noticed:

It was observed at *Grenoble*, in France, that the cast-iron feed-main had reduced its flow on this account, between 1826 and 1833, from 370 to 190 wine gallons per minute.

It was noticed at *Cherbourg*, that from 1836 and 1838 to 1850, the effective section of the supply main had been reduced to less than one-third its original calibre, the accretions being 1.575 to 1.968 inches in height.

In the reports of the water-works in England, numerous instances are recorded of the effects of tuberculation, which are also prominently noticed in locomotive boilers, and other kinds of exposed iron work.

In 1852, Mr. E. S. Chesbrough, engineer of the Cochituate Board, Boston, reports that—

"The rapidity with which the interior surfaces of some of the pipes have been covered with tubercles or rust, has excited a great deal of interest. * * * All the large pipes that have been opened, have been partially or entirely covered on their inner surfaces, some with detached tubercles varying from a half to two and a half inches base, with a depth or thickness in the middle, of from one-quarter to three-quarters of an inch; and some entirely to an average depth of half an inch, with a rough coating, as if the bases of the tubercles had crowded together. The smaller pipes all exhibit some action of this kind, but generally to a less extent as regards thickness, than the larger ones. In one case, however, a 4-inch pipe was found covered to a thickness of about one inch."

In 1853, the Cochituate Board remarks:

"The extent to which these accretions have affected the discharge of water from the pipes, by diminishing their area, and increasing the friction, has been satisfactorily ascertained by observations made by the city engineer, with great care, on one of the 30-inch mains across Charles River, and is found to be much greater than was anticipated. The loss of discharge under the common head of six inches was found to be upwards of twenty per cent. of the known discharge of a new main of like diameter. Similar observations on the 30-inch main from the Brooklyn reservoir, under the ordinary head of eight feet, gave the same result."

This action at Boston was very carefully recorded for a time, demonstrating a very serious injury to the whole distribution system. The Board, however, seems to have consoled itself at last with the theory that the action exhausted itself at a certain stage, and continues to extend the service with cast-iron pipes.

The effective diameter of the 20-inch main of the Jersey City Water-Works, recently examined, was found to be less than 18 inches.

Considerable reduction from tubercles is recorded on the Croton mains and smaller pipes.

From the action of the water on the pump valves and other engine-castings of the Brooklyn pumping engines, the discoloration of the water at fires, and other evidences, this action is serious on the unprotected Brooklyn distribution.

Similar effects are recorded in various other water-works of the United States, in conformation of what may be properly assumed as a law of chemical action, more or less powerful, in special localities.

Preventives.—Various efforts have been made to apply washes, paints, and varnishes, by different processes, so as to prevent contact between the water and iron, in castings as well as wrought-iron work. A galvanic action has also been provided by coatings of zinc and other metals, and various enamelling processes have been invented.

Among these may be mentioned white-wash of pure lime, a wash of hydraulic cement, linseed oil applied under pressure, a composition of oil and wax, copal and other varnishes, lead and zinc paints, and coal-tar varnish or paint.

And of all these, including galvanism and enamelling, experience goes to show that they have various special merits as palliatives, but no permanent power as preventives. Paints of all classes need periodical renewal; varnishes and enamels sooner or later peel off or wear off; and galvanism simply delays by destruction in one direction, the eventual process of destruction in another. To make either palliative effectual, even for a time, requires careful and expensive workmanship, and the point of final failure, is merely a question of time, which question should properly determine the propriety of its use, in connection with the relative cost of use, in those cases where want of access prevents renewals.

On large dry-dock gates and caissons of wrought iron, exposed to sea-water, without excessive motion, we have found a body-coat of red lead, with super-coats of zinc paint, the most durable and satisfactory; while for the iron-work of steamer water-wheels and other parts much exposed, coal-tar paint, though requiring frequent renewals, is more easily applied, and probably more effectual. Various experiments which have been made with coal-tar varnish in contrast with other coatings, seem to favor it strongly when applied to a hot and clean surface, although its advocates admit its defects when not thus applied. Hence this process has been adopted in several water-supplies in England, and is being introduced into this country to a considerable extent. The large mains at Brooklyn, with those now used for extensions, and the 5-feet mains of the Croton extension, are thus coated. Other water-works are following this example, all the pipes required for the Charlestown Water-Works, now going under contract, being specified with this protective, in case cast-iron pipes are used at all.

As now applied in this process, the pipes are dipped in a varnish-bath, maintained at a temperature of 300°, when first cast, or are oiled to prevent rust, until they can be coated. The additional cost is about $1 25 to $1 50 per ton. The pipes being laid, renewals in coating are prevented, and its duration will vary with circumstances, being in some cases a matter of years, in others, of months and weeks. Of the mains coated by Dr. Smith's process at Glasgow, for the Brooklyn works, many of those exposed in the pipe-yard for a few months, lost their varnish from the effects of the weather, while others remained in good condition, and all the coatings hitherto applied, can only be regarded as palliatives.

While it is fixed and certain, that no engineer is justified in laying unprotected cast-iron pipe, the protections themselves require careful study, and the most faithful application.

Wrought Iron Cement Pipe.—Among other substitutes which have been adopted for water-pipes, those of wrought-iron riveted in proper lengths, and lined and coated with a thick body of hydraulic cement mortar, have been very extensively used in this country, within the past fifteen years. The several lengths are put together by butt joints secured by sleeves, filled in with cement to prevent leakage, or by cast-iron hubs protected by mortar from contact with the water. The pipes by one process in use, are lined with mortar applied under strong pressure, and coated when laid in the trench; and by another process they are both lined and coated under pressure at one operation. In one case the taps are inserted by brazing a tap plate and tap to the outer iron shell before the drill is used; and in another, by the use of cast-iron rings tapped as in ordinary cast pipe.

Without discussing the merits of the several patents which apply to details of manufacture, it is manifest that the pipes themselves embody an important principle of durability, by the preservative effect of cement on iron, which excludes air and prevents oxidation and tuberculation, and which continues to increase in solidity and strength with increased age. It is also manifest that any desirable measure of strength may be attained by regulating the quality and thickness of the iron body. The cement lining is not less than one half inch thick for the smaller diameters of three and

four inches, and by pressure is very firmly set to the iron plate.

Pipes of this kind can be manufactured and laid with less cost than those of cast-iron, and have several valuable qualifications, when properly put down.

Lead Service Pipe.—The use of lead for house service from the street mains, although a matter of common practice, has given rise to elaborate investigations and discussions in Europe and in this country. This use has obtained against the serious objections urged against the material, on account of its ductility, its strength, and its sources of profit to plumbers, and some disadvantages in manufacture or use of its occasional substitutes. In some cities, however, as at Hartford, it is directly prohibited.

From the investigations on this subject at Boston in 1848, about the time of introducing the Cochituate supply, it was determined to admit its use. While all the experiments showed that lead is dissolved by water, it was argued the Cochituate was not more dangerous in this action than the Croton, and that "a coat forms on the lead, which, for all practical purposes, becomes, in process of time, impermeable to, and insoluble in, the water in which it occurs." And this sums up all the chemical discussion in its favor, viz: that the quantity dissolved is insignificant, and that the process is self-protective in time.

It is plain, however, from an examination of the varied analyses and discussions of this matter, that the defence is apologetic at the best; while, on the other hand, the doctrine of cumulative effects, the voluminous testimony as to lead diseases, the extensive prevalence of those which may be directly or indirectly attributed to the effects of lead, ascolics, paralyses, neuralgia, rheumatism, &c., and the proof that at Boston and in other localities the coating is not a protective, certainly justify a distrust of this claim of immunity, and a general rejection of the material. To furnish an adequate and safe substitute certainly need not over-tax engineering skill.

Appurtenances.—Of these, stop-cocks and hydrants are the most important; the former being used to district the supply for convenience of repairs and access, and the latter for fire purposes, street washing, and other public uses.

Among the various forms of stop-cocks in use, probably the best are those which are built with a globular head acting in part as an air-chamber, and with a flaring groove for the gate. In the first case, greater strength is secured in a limited space; and in the second, the gates are prevented from jamming, as the larger ones are apt to do with too narrow a groove, in working one brass face against another. Face joints are also preferable to lead joints, in obviating the necessity of caulking. Much inconvenience is often caused by improper arrangement of the stop-cock districts, where long distances are attempted to be controlled to save expense in original construction, and it is desirable to condense these districts of control as much as possible.

The ordinary form of fire hydrant in use, as to the tube itself, and not as to its case, seems to have been adopted from one city to another, with very little regard to its purpose of operation. The range of ingenuity seems to have rested content with the automatic vent which drains the tube above the valve when not in use, to prevent frost. In the ordinary tube, the valve is operated within, by a rod passing through a stuffing-box in the tube-head, which raises and lowers it, to close or open the hydrant. Generally, a four-inch hydrant main is attached to a three-inch vertical tube, with a two-and-a-half-inch nozzle, and the effective section of the hydrant is less than one-half the section of the branch main. Hence it follows that in consequence of excessive hydrant friction, the supply of a street main, six inches in diameter, cannot feed more than two fire-engines on the same block, through two hydrants, and our steam fire-engines are obliged to put a suction on the hydrant nozzle, to get their supply at all.

Now, it is evident that if there is any propriety in using four-inch branches, there is none in using hydrants throttled down by rude, internal working parts, to effective sections of less than one-half the branch calibre, and with the universal introduction of steam fire-engines, all the present system of branches and hydrants must be improved. There is no mechanical difficulty whatever in making hydrant-tubes with a free delivery equal to that of the branch, and this should always be done.

In all cases where steam fire-engines are provided for, the hydrant nozzles may be adapted by the use of a double nozzle, either to the ordinary hose connection, or a steamer connection of the full hydrant size; but the best way to arrange them is to make a full-size hydrant nozzle, using a set of reducers for ordinary fire hose. Instances abound in the experience of firemen, where most valuable property has been lost, solely on account of the excessive friction of hydrants, where time prevented the intervention of engines.

The use of iron cases, both for hydrants and stop-cocks, is an improvement on the ordinary wooden boxes, which should be made universal, as a matter of economy, science, and ornament.

The following table will illustrate the relation of appurtenances to mains adopted in the case of a single prominent supply.

Aggregate Boston Distribution, January 1, 1862.

Diameters (inches).....	40	36	30	24	20
Length of Pipes (feet)...	23.081	21.062	31.836	5.773	24.127
Stop-cocks.....	4	5	8	10	11
Hydrants.....					
Diameters (inches).....	16	12	6	4	Total.
Length of Pipes (feet)....	7.619	90.625	384.480	104.633	693.240
Stop-cocks.....	22	163	682	283	1.188
Hydrants.....					1.451

On this work all the wooden boxes which are replaced are Burnetized to prevent decay.

In this rapid sketch, in which the discussion of details is not admissible, we present, as to distribution, some of those prominent features which directly affect its cost, durability, and usefulness, and which involve systems of practice more or less common, and, in some cases objectionable, with the hope that inventive genius, prompted by general assent, may mark out the most feasible and satisfactory correctives for our adoption.

(*To be continued.*)

PETROLEUM ITEMS.

The Oil Creek Railroad.—This road was so far completed as to admit the running of the locomotive and cars to Titusville on September 30th. Titusville can now claim a connection with the outer world. No community could rejoice more at the consummation of such a project than this. All who have ever visited the oil region and traveled over the road from this to Union, or the Junction, will be glad to learn that there is now a means for their doing so with greater ease and a less liability of being "pumiced."

This road will afford superior inducements to shippers of oil. It will also be an important feeder to the Atlantic and Great Western Railroad, and, connecting with the New York and Erie, will make the route to New York city direct.

Inflammability of Refined Oil.—A Philadelphia paper thus refers to the safety of refined oil:

The consumption of this article has given rise to serious apprehension, in the minds of cautions people, as to its safety when stored in any quantity in populous districts. Those who have most to do with it, pronounce it quite as harmless as any other article of commerce, and declare that it will not ignite unless fire is applied, and even then the heat must be intense enough to fire any ordinary combustible material. The fire on a vessel at Christian street wharf during the summer has been cited to disprove this latter assertion, but some of the parties aver that the watchman had fallen asleep and allowed a fluid lamp to fall and fire the vessel, which, of course, fired the oil. Mr. Huston, the Freight Agent of the Pennsylvania Central Railroad, states that large quantities are daily transported over the road in oven trucks, near the locomotive, the sparks form which continually fall upon the barrels, but not a single accident has resulted from it. The Portland oil is brought in vessels constantly, yet no fire has ever occurred on shipboard from the oil. The crude oil is considered most dangerous, the naphtha or benzine being its explosive quality; but even this is harmless unless confined in air tight apartments, when the gas generated will explode if flame be introduced.

Price of Canadian Petroleum.—We have noticed the fact that an association of owners of wells in Canada has been formed to further the interests of parties raising and forwarding the crude oil. The immediate effect of this coalition was to put up the price of the petroleum. The Oil Springs *Chronicle* deems this result a matter of congratulation, while the *Journal of the Board of Arts for Upper Canada* has the following judicious remarks, which owners of oil-wells in that region would do well to ponder:

"We are quite sure that no one would for a moment grudge a fair and remunerative compensation to the well owners for the time and capital they have expended, the anxieties they have suffered, and the risks they have run, in developing the oil resources of Enniskillen. But there is danger in any attempt to raise the price of an article beyond its legitimate commercial value by any and every kind of monopoly. There are always two parties to a transaction—the buyer and the seller. If the Oil Association raise the price of their oil beyond a certain margin, which is well defined at one dollar a barrel, buyers will seek more liberal markets. The object of the association should be to attract the attention of Commercial men in Europe to their oil on account of its abundance and cheapness. Raise the price of the oil, and another market will be sought. We believe that oil will be found over a large area in the United States on the rivers or near the boundaries of the great coal-fields, which indicate pretty accurately the geological position of the Devonian rocks in which the oil has accumulated. These rocks have an immense spread in the United States, and indications of accumulations of oil are now known to exist over a very broad area. There is every reason why the supply of oil should be equal to the demand, and it is perfectly well known among commercial men, that when a trade has once taken a certain direction, it is most difficult to divert it. The American oils are now well known in Europe; the Canadian oils are only beginning to be known. It is of the utmost importance that European importers should be made aware of the facts, namely, the permanency of the supply, the accessibility of the material, and the absence of any monopoly to keep up the price. Monopoly of a natural product stinks in the nostrils of the commercial men of the present day; the Oil Association of Canada can make no more fatal mistake than of raising the price of oil beyond a fair source of remuneration to themselves; and if by this means the trade should be directed to the United States, and the foreign buyer seek for his supply in the cheapest market, where no monopoly to keep up prices exists, the Oil Association of Canada can neither expect sympathy nor encouragement. One dollar a barrel affords, we are informed, a handsome profit to the well owners. If the Oil Association goes beyond this mark, they will certainly entail ruin on the trad, or be compelled to reduce their price below the proper margin. Already American petroleum commands a higher price in Europe than Canadian, because it contains more of those lighter oils which are valuable there for different purposes in the arts. We do not expect to see Canadian oil higher than one dollar a barrel. We should not be surprised if the Oil Association found it to their advantage to reduce the price rather than to raise it. The laws which govern the relations of buyers and sellers are unalterable in the long run, and, in these days of commercial freedom, far removed from the influence of monopolies."

Philadelphia, Pa.—A Philadelphia paper informs us that the price of gas in that city is to be increased, all the resolutions to the contrary notwithstanding: "The Government tax upon coal-gas is twenty cents per one thousand feet, to be levied on all bills of gas paid to the companies. The Philadelphia Gas Company has, in consequence of this tax, raised the price of gas per thousand feet in a corresponding degree, leaving the price $2.20 per thousand. The company allows nine per cent. on all bills paid within the specified time; the addition, therefore, makes the tariff two cents more upon a thousand feet."

Water Supply of Fort Pulaski.—The water supply of Fort Pulaski, commanding the Savannah river, Georgia, is condensed from steam made from sea-water. The condensing apparatus was made by Mr. Gilmore of Paterson, N. J. It condenses 4,500 gallons daily more than is consumed by the troops. Before the erection of these works, all the water for the fort had to be brought from Beaufort and Bay Point.

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

LIGHT, HEAT, WATER-SUPPLY AND SEWERAGE.

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JOHN B. MURRAY,

Rooms of the AMERICAN GAS-LIGHT JOURNAL,

No. 39 Nassau st., cor. of Liberty st., opposite the Post-Office.

New York City.

AGENTS OF THE AMERICAN GAS-LIGHT JOURNAL.

FOREIGN.

Germany .....B. WESTERMAN & Co., of New York.

Great Britain....TRUBNER & Co., 60 Paternoster Row, London, where single copies may always be found,

Paris, France. ..LE JOURNAL DE L'ECLAIRAGE AU GAZ, 25 Boulevard Poissonnière.

DOMESTIC.

V. HAROLD MYERS, No. 152 South Fourth st., Philadelphia.

The AMERICAN GAS-LIGHT JOURNAL can be purchased of all the newspaper and periodical dealers in the U. States and Canadas.

THE
AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

PROPRIETOR, JOHN B. MURRAY. | EDITOR, C. ELTON BUCK.

SATURDAY, NOVEMBER 1, 1862.

The most ridiculous farce of the season has been played, and it is to be hoped that the curtain has fallen for the last time upon scenes of such absurdity. We refer to the proceedings of the Committee of the Board of Aldermen of this city in their recent attempt to try the right of the city to assume the charters of the Manhattan and New York Gas-Light Companies, and thus to add to the other performances of the "ring" the attempt to make and distribute gas upon a political basis. The Committee, composed of Aldermen TERENCE FARLEY, WILLIAM WALSH, and JOHN H. BRADY, held their first session on Tuesday afternoon, October 14th, at which, besides the usual hangers-on around the City Hall, and the reporters of the Press, not more than half a dozen persons were in attendance. Alderman FARLEY occupied the chair, which his ample size enabled him to fill in the most literal sense. Amid the resplendent lustre of a large diamond pin, and his conspicuous aldermanic badge, the good-natured countenance of the worthy dignitary encouraged the timid to be bold in their complaints, and to recount the solemn story of the wrongs heaped upon them by the gas companies unreservedly and fully, so that the nature of the complaint might be understood, and punishment be meted out to the guilty parties, and future exemption from wrong secured. Lured on by the tempting bait, one injured consumer arose, and told how much he had been overcharged—that his bills were enormous, and he was fully satisfied that he burned but a small proportion of the gas he paid for. When asked if he examined the meter, he confessed his inability to read the dials, and admitted that his surmises were all guess-work. He did not believe the meters to be reliable, and believed that the gas companies guessed at the amount of gas consumed, and made out their bills upon the same unstable basis. This concluded the "testimony" of the "wronged consumer"—the same old story, told in the same ridiculous way that all such surmises are usually expressed.

Next followed a gentleman who confessed to have been a graduate of that immaculate school of virtue, the New York Legislature, and who in a short speech dwelt upon the benefits which would ensue if the Councils took charge of the works, and serve gas to consumers as the Croton water is now distributed. The speaker, probably knowing from experience the incorruptibility of men in public life, spurned the idea that peculations would ensue on the city taking charge of the works. "Such ideas," said he, "emanate only from jealousy—and charges of corruption are made by the ignoble public, they being envious of the power of those in authority!" The speaker took pains to express his individual belief that the Councils of New York are composed of men who would not allow the prospect of private gain to divert them from the public good, and utterly repudiated the opinion that corruption would take place in view of the immense patronage which would be within the gift of these dignitaries should they ever obtain control of the gas-works. At the enunciation of this opinion a general titter ran round the room, in which the sides of the worthy Aldermen shook quite as heartily as those of any others present.

Gentlemen were also present at the meeting with axes of their own to grind in the shape of new processes for making gas at remarkably low prices. To these individuals, as well as to many others, the mere call of the committee seemed a windfall, and the most wonderful promises were made of taking the works and other property of the present companies at a "fair valuation," and furnishing gas at a lower price than any ever before reached in this country.

After several adjournments for trivial pretexts, the meetings of the committee were indefinitely postponed—the shrewd members of the same, no doubt, discovering very little prospect of private gain, and being probably wearied by the discussion of a subject foreign to their usual habit of thought. The opinion of GREENE C. BRONSON, Esq., Counsel to the Corporation of New York, served as a damper to the aspirations of those who hoped to profit by the controversy, and as for the gas companies themselves, the parties most interested in the matter, they treated the whole subject with deserved contempt, feeling secure in the possession of rights which they know to be impregnable.

Thus has ended one attempt to abrogate the privileges of our metropolitan gas companies. Let it be hoped that no more such ridiculous exhibitions be made, and that if it be desired to benefit consumers, other and more sensible means be taken than the one referred to, which has the appearance of a black-mailing scheme more than anything else.

In another part of this number of the JOURNAL will be found a review of Mr. COURTENAY'S criticism of the opinion of the Supreme Court of Wisconsin, in the case of SIDNEY SHEPHERD *vs.* THE MILWAUKEE GAS-LIGHT COMPANY. In this review we ourselves come in for a share of the writer's causticity, but as all personality is disclaimed, and acting on the principle *audi alteram partem*, we admit it into our columns because of the writer's legal knowledge and admitted argumentative skill. Although desiring to preserve his incognito in this instance, he has before now broken the lance with those whose views have differed from his own; and our previous volumes contain here and there a few scattered fragments from the same pen, evincing an aptness for discussion which has been successfully exhibited in other arenas.

From a paragraph which will be found in another column, it will be seen that the Philadelphia Gas Company have imposed the war-tax on consumers. This, be it remembered, is a municipal gas company, and yet it not only puts the tax on consumers, but instead of fifteen cents, which the New York companies proposed to add, it puts on twenty cents per thousand cubic feet. This will be a hard nut to crack for those advocates of municipal gas companies, who are ready to believe that such corporations are the embodiment of everything that conduces to the comfort and well-being of the consumer. A short experience of burning gas from a company under city control would dispel such opinions, and the customer would soon find out he had been pursuing an *ignis fatuus*, which would lure him on to many disappointments.

The Aldermanic Committee on Ordinances had a brief sitting, on Saturday afternoon, October 25th, to consider a proposed "Ordinance to regulate the sale and storage of rock or earth oils, petroleum and kerosene oils, and naphtha and benzine." It provides the privilege of storing unlimited quantities of petroleum in the city, when the standard of evaporation is at and above 140 degrees Fahrenheit; evaporative below 140 is considered dangerous; and provision is made for confiscation of these oils vaporizing under that grade, unless kept in certain quantities and under very explicit and stringent regulations for safety. Fire-Marshal BAKER was present to address the Committee, and also a gentleman with an instrument which indicated the degree of heat at which evaporation is produced. Mr. BAKER briefly explained the necessity for such an ordinance, and the Committee adjourned till 2 o'clock P. M. of the 6th of this month, when a full hearing is to be given.

PATER FAMILIAS ON THE RAMPAGE.

Our London contemporary the *Journal of Gas-Lighting*, the subsidised mouthpiece of a few of the English gas companies, is terribly exercised at the independence of this JOURNAL in berating the New York gas companies for imposing the war tax on their consumers. Viewing the matter from its own narrow stand-point, the London *Journal* cannot comprehend how a paper like ours can have any independence, and it is exceedingly amazed at our temerity in dealing blows, even though fully deserved. *Pater familias* in his amazement, becomes angry, and, forgetting that the exhibition of a bad temper is extremely undignified, he fairly boils over with passion and uses some very strong expressions. He says:

"* * * The article on this subject, which we reprint in another column, is a specimen of American journalism of the lowest kind, and may take rank with the choicest productions of the FLINTOFFS and HUGHSES of the mother country. * * * * The folly, impudence, and recklessness of these assertions even surpass any that we are accustomed to on this side of the Atlantic from the declared enemies of gas companies. The alleged bribery of members of Congress would have been far more profitably directed in exempting gas from taxation than in regulating its payment, for the consequent rise in price must necessarily reduce the profits of gas companies by diminishing consumption; and the amount of the tax charged to the consumers bears no proportion to the extra cost of production arising from the depreciation of the currency. It would be difficult for the assailants of the New York gas companies to assign a reason why the price of gas should not be raised, with that of every other manufactured article, according to the diminished value of the paper money received in payment; yet there has been no addition to the price beyond the special excise duty which the law enacts shall be charged to consumers. We have had recent experience of the loss which the depreciation of the currency causes to those who desire to convert paper into gold. The coupons of some American bonds of which we are holders, realized a year ago 4*s.* 1*d.* per dollar in London; but now, the best price offered is 3*s.* 1½*d.* Some estimate may be formed from this reduction in the value of nominal currency, of the rise in prices in America of labor and of all articles, either of foreign or of native produce, which must be paid for in gold or gold's worth. So far from deserving the opprobious charge of neglecting their duties as citizens, the New York gas companies have taken an active part in carrying on this unhappy war, by raising a regiment, whose triumphant return from the battle-field, under command of the president of the principal gas company, was chronicled by our contemporary in the number previous to the one in which the gas companies are accused of refusing to assume their fair proportion of the public burdens, and of 'sneaking out' of their share of the responsibility."

It is not strange that our contemporary is surprised at the tenor of our remarks. An independent expression of opinion in gas matters is something which it cannot comprehend. Subsisting as it does upon the charity of some of the London companies, the *Journal* echoes their views, and does not dare to reprove them for any waywardness they may manifest. Under the circumstances of the case, we cannot blame the *Journal* for eating its humble pie; for had it the temerity to enunciate any opinions of its own, it would dearly pay the penalty of its

presumption. The axe of retribution would fall upon its devoted head, and we should be under the sad necessity of placing our columns in mourning for the worthy parent who counts us one of the most precocious of his offspring. We must not condemn the *Journal* too harshly for truckling to the caprices of its masters; for this is a necessary phase of its existence. Parasites, in order to retain the favor of their patrons, must learn to curb their own desires, and to fall in with many whims. Their road through life is therefore a hard one, and although it should excite our commiseration, yet it is sometimes natural to feel a little impatient at the sight of such abject servility, and to make use of expressions of disgust.

The AMERICAN GAS-LIGHT JOURNAL, as we have before said, "is the organ of the gas-light interest in its broad, public-spirited, fair-dealing sense;" but being the "organ" of the gas-light interest, does not preclude it from having and freely expressing opinions of its own. It has endeavored to treat all subjects in a candid and open manner, and has not spared reproof where it seemed deserved. Preserving a strict impartiality, it has steered alike clear of undue adulation on the one hand, or of too severe censure on the other, and profiting by the spectacle afforded by the pliant toadyism of the London *Journal*, it has endeavored to avoid falling into similar evil courses.

With regard to our reprehension of the New York gas companies for raising their price by adding the war-tax to their bills, the subsequent action of the companies in taking off the tax, is sufficient evidence that we were right in our view of the matter. Had they observed our advice in the first instance, they would have been spared the clamor which has been raised about them, and the mortification of being compelled to back down from a position which their sense of propriety should have taught them to be untenable. Having now come to their senses in this respect, and fallen into the line with *nearly all the other gas companies in the United States* who pay their own tax, it is to be hoped that their future course will be mutually satisfactory to themselves and their consumers. Of the 420 gas-works in this country, we are satisfied that at least four-fifths of them will pay the tax without adding it to the bills of their customers. If this large proportion—most of them country companies with limited consumption—can afford out of their meager returns to assist in replenishing the national coffers, surely the two largest companies in the land should willingly do the same. Unfortunately they did not *willingly* see fit to conform to the example set them by the other companies, but strove to be more overreaching in their aims—hence the clamor of the people; the upbraidings of the daily press; the language of censure which we used, and the healing balm offered to the companies by *pater familias*, who abjectly kneels before them in the hope of being placed upon their list of pensioners.

We must not be too hard upon *pater familias*. We must remember that the old gentleman is in his dotage, and that he is feeble and gouty. We must overlook the intemperate language he uses when he gets on the rampage. It is to be hoped he will learn to curb his temper; for unless he controls himself, he may at some unguarded moment talk angrily to his masters, in which event he may lose his position as "organ," and some more amiable instrument be selected to play the role he now attempts to fill. We, however, promise to intercede in his behalf, and to assure the companies he represents, that whatever aberrations he may exhibit, they had better magnanimously overlook them, and continue their benefices to him; for, take all things together, they could not have a more pliant tool.

RICHMOND COUNTY, N. Y.—The Richmond County Gas-Light Company assumes the payment of the war tax.

OUR POST-OFFICE DEPARTMENT.

There is a screw loose somewhere in the Post-Office Department. Whether it is in the New York office, or along the mail routes all over the country, we are not prepared to say. But wherever it is, it has for some time past caused us considerable trouble. Almost daily we hear complaints from our distant subscribers, that numbers of the JOURNAL fail to reach them, and furnishing the missing numbers causes us to have about twice as many printed as our subscribers are entitled to. Copies of our paper, securely wrapped, are promptly mailed, and as this work is done under our own supervision we are convinced the evil exists after the Government takes charge of the mails. Not only do subscribers fail to obtain their papers, but numbers of our exchanges, foreign as well as domestic, are lost, and the inconvenience we are frequently put to is annoying in the extreme. This evil has been growing apace for the past two or three months, and it is high time that it should be remedied.

Mr. WAKEMAN, the present exemplary Post Master of this city, has, during the brief period of his incumbency, effected many reforms in the postal department of the metropolis. We hope his executive talent may find an ample sphere for exercise in placing the foreign and country mails under a more vigilant supervision, so that the annoyances we have been subjected to may cease. Printed matter is treated, in some post-offices, as of secondary importance, and frequently letters and papers mailed on the same day, are extremely uncertain in delivery, the latter being detained in some unaccountable manner, sometimes not coming to hand for several days after they are due. Will not Mr. BLAIR or Mr. WAKEMAN give this subject their attention? A few words from them may save us a deal of trouble.

ANSWERS TO CORRESPONDENTS.

L. E., of Mass.—*The present price of rosin entirely precludes its use in gas-works. Petroleum is the best substitute which we are aware of.*

O. P. Q., of Ohio.—*Your views are correct. We will attend to your request and forward the articles by mail.*

E. A. S., of N. Y.—*Your question is one covering much ground and will require an answer of some length. You do not say what particular impurity you want to test. What would do for one would not do for another. For sulphuretted hydrogen, test papers, made by passing paper through a solution of acetate of lead, or still better, nitrate of silver, are used. In looking for this impurity a piece of this paper is to be moistened and exposed to a thin stream of the gas, when, if the suspected gas be present, it will soon be blackened. For ammonia, yellow turmeric, or reddened litmus papers are to be used in the same way. The former will be turned brown and the latter blue if any ammonia be present. Carbonic acid may be detected by passing a stream of gas through lime water, when it will be rendered turbid if any of this gas exists. Mention what particular test you want and we will be more specific in our reply.*

A. D. J., of N. J.—*Yes. It was obtained only after much corruption and bribery had been indulged in.*

RECOVERY OF MR. SABBATON.—Mr. Joseph A. Sabbaton, the accomplished engineer of the Manhattan Gas-Works, and, permit us to add, the Adonis of the profession, has resumed his duties after a sick furlough of eight months. Notwithstanding Mr. Sabbaton's protracted relief from service, his ambitious devotion to duty—the direct cause, indeed, of his severe illness—will never justify the supposition that the chaplet which encircles his classic brow, is formed, like those of some of our Martial Engineers, of the Leaves of Absence. Mr. Sabbaton returns to duty with more vigor than ever, and, if it were possible, with our better wishes for the accomplishment of his highest hopes.

THE ELECTRIC LIGHT.—Mr. Brachet has suggested the enclosing the light in a double globe of glass, the inner one to be of uranium glass to arrest the chemical rays; the outer of glass of a color which will absorb the greenish tone of the light transmitted through uranium. The French Academy have referred the subject to the eminent chemists MM. Regnault and Babinet.

GAS-LIGHT COMPANIES *vs.* GAS CONSUMERS.

A REVIEW OF A REVIEW OF THE DECISION OF THE SUPREME COURT OF WISCONSIN, IN THE CASE OF SIDNEY SHEPHERD *vs.* THE MILWAUKEE GAS-LIGHT COMPANY.—BY A GAS CONSUMER.

For the AMERICAN GAS-LIGHT JOURNAL.

The writer hopes to be pardoned for saying that, upon reading in the columns of your JOURNAL what appeared to him a very able and learned decision and opinion of the Supreme Court of Wisconsin, he experienced a feeling of genuine satisfaction. Perhaps such emotion was wrong, illegal, or at least injudicious. But, nevertheless, he could not help it, did not want to help it, and gave full scope to pleasurable sensations of the kind one experiences when Shylock is deprived of the pound of flesh, no matter how oft the play is repeated, and in spite of some sharp lawyer whispering that the judgment is against the "spirit of law," and that "flesh," *interpreted reasonably*, includes "blood." One of the pleasant feelings experienced by the writer was a sense of increased personal importance. He had always a sort of an idea that there were people equal to gas people, and now visions of courteous gas presidents, affable gas secretaries, urbane collectors, and respectful "come to take the meter" persons, flitted across the field of his reverie.

There was a delightful sense of security in indulging in the confident expectation of the speedy realization of these conceptions, for had not the County Court reversed the decision of some local Dogberry and decided that gas company "rules" were not "rules" unless "*reasonable*," and had not the Supreme Court of of Wisconsin affirmed this decision?

Moreover, had not the Court decided that it was *unreasonable* to require people to allow gas people to come into their houses whenever they like, or to cut off the gas and leave them in the dark when they please, themselves being the judge of the time and occasion? Had not the Court also decided that Sidney Shepherd had the natural, indefeasible, and unalienable right to fix his own gas-fixtures, as much as he liked, and whenever he liked; that a "rule" which would prevent him from so doing was *unreasonable*, and that Shepherd rightfully refused to submit to and sign, and should have gas without signing and submitting to such rules, and to another rule by which he was required to agree to submit to any future rule the gas company might make?

With a deep respect for the justice, learning, and wisdom of the Court as manifested by their decision, and the reasons therefor in the opinion rendered, there was mingled gratitude to Sidney Shepherd, the emancipator of gas consumers, a worthy namesake of the immortal Sydney, a successful practical reformer. His name would be dear to gas consumers and be celebrated in verse and story, as long as gas shall flow, in wet or dry meter.

But alas! poor Shepherd; according to the next number of the JOURNAL, after all you are only "an obscure individual" who "has been lifted into a somewhat conspicuous position," * * "Like the poor negro, Dred Scott, and others owing their fame to legal quibbles." Not equal to Dred, however, for while "the name of the African will be connected with the idea of personal freedom, the name of the other [Shepherd] will stand as evidence of petty spite." And alas! for us gas consumers, emancipated through the Court by Shepherd, we are not what we should be. "There are many consumers who are perverse enough to take advantage of the opinion merely for the purpose of fomenting a disturbance," says the same editorial, which also informed us that the rules pronounced unreasonable and void by the Supreme Court of Wisconsin are substantially the same as the rules of all gas companies, who have a right to them because they imported them once from England, and gas consumers have submitted to them ever since.

Alas! for the Supreme Court of Wisconsin, who have not light to see that rules whichgas companies import from England belong to them, and are beyond interference by a Court.

These opinions editorial appear in a very flattering introductory notice of "an able criticism by Robert G. Courtenay, Esq., President of the Louisville, Ky., Gas-Light Company, on the decision of the Supreme Court of the State of Wisconsin."

Upon a careful perusal of the "Review," the reader must inevitably come to the conclusion that either the Supreme Court of Wisconsin or the reviewer is in error. The writer inclines to the latter alternative, notwithstanding the editorial opinion that the reviewer's "views have been constructed upon strong foundations," and after making due allowance for the circumstance that being a gas *consumer*, he may be slightly prejudiced in *favor* of the Court.

> "Where self the wavering balance shakes,
> 'Tis rarely right adjusted."

One of the most noticable features of the review is an extreme and all-pervading modesty, distinguishing it from most similar productions, which are frequently disfigured by display of personal vanity, usually evinced by redundancy of personal pronouns and by careless and shocking levity of treatment of the opinions of the highest personages of the church or state.

The reviewer commences modestly with a regret or apology for ignorance of the subject matter of the review. He says: "I have been unable to procure a full report of the case." Who but a modest and unfledged reviewer would tell his readers that he was about to review a decision and an opinion of a Court without having read a full report of the case upon which the opinion was founded? But ignorance of the subject should be no bar to reviewers, else how could many reviews be written?

Most *lawyers* would carefully study the whole case, weighing all the facts, law, and arguments *pro* and *con* before pronouncing against a decision of the Supreme Court of a State made after a full hearing of the case, and more particularly when the decision had the weight of the concurrent opinion of the County Court from which it was appealed.

But all things are possible to reviewers, especially those who, from long experience and enjoyment of the special privileges of a gas company, feel themselves competent to illume the understanding of a Court not perfectly well up in the art and mystery of eliminating gas.

The Court being of opinion that, as a rule, gas is conveyed to consumers in pipes, is gravely informed that *sometimes* gas is forced under pressure into iron tanks or cans—a fact of which, no doubt, the Court were aware, as the exception to the rule. The Court having ventured to say that gas "is paid for *after it is used*, because it cannot be measured before," is also told that after gas is burnt, it cannot be measured, but is always measured before, in which the reviewer is clearly mistaken unless they use new-fashioned meters in Louisville. Hereabouts, the process of burning and measuring go on together, and ten thousand feet of gas are not measured until the last inch is burning. Does the reviewer mean to say that meters measure gas so that gas companies can ascertain in advance the quantity of gas consumed, or does he make this point upon a mere quibble upon the meaning of words that to the ordinary understanding unoppressed with "*technical knowledge*," are perfectly plain?

Of a similar character is the criticism of the Court's opinion of the 9th rule. The reviewer says that "*all times*" should have been "*interpreted reasonably*" by the Court; that the company did not want to go into premises at unreasonable times, and if the words "reasonable times" were substituted for "all times," the Court could not have objected, but doubts "the right of the Court to scrutinize the terms of the rule to make it void," the English of which is, he doubts the right of the Court to interfere with "all times." But it seems *the Court* had no doubt, and did interfere. Why does not the reviewer who criticises the Court in so modest a way advise the gas companies to change "all times" to "reasonable times," so as to avoid this unpleasant interference with "all times" by the Court, if "reasonable times" will do as a reasonable interpretation of "all times?" Is it because "all times" came from England, a land of special privilege, or because "reasonable times" will not exactly suit gas companies?

The next attack upon the Court is in such excessive good taste and temper that it deserves especial notice. The review says of the 14th rule which Shepherd refused to sign, and which the Court pronounced unreasonable and void, that "*an honest man would not object to subscribing to these rules because of this 14th rule.*"

Rule 14. "The Company reserve to themselves the right, at any time, to cut off the communication of the service-pipe, if they shall find it necessary to do so in order to protect the works against abuse or fraud."

Every consumer knows that this rule is enforced by cutting off the gas-pipe when there is a disagreement about the bill.

The Judges of the Court say that, according to the law of the land, fraud and abuse must be judicially established before gas companies can rightfully deprive a consumer of gas by cutting off his service-pipe. But, according to our reviewer, the objector to the rule cannot be an honest man because of the objection. Of what, then, must the Court be constituted who affirm the objection?

Before berating the Court for its opinion of the rules, the reviewer plainly intimates that the Court was travelling out of the record in scrutinizing the "Rules," imported as they were from England, and adopted by the Louisville Gas Company twenty-three years ago. However, he admits that other courts have interfered with "rules," and cites a decision of a Court of New Jersey.

"Whether a by-law is reasonable or not, is a question for the Court solely; and evidence to the jury on the subject, showing the effects of the law, was held inadmissible. To set aside a by-law, however, for unreasonableness, there should be no equipoise of opinion upon the matter, but its unreasonableness should be demonstrably shown." (Paxson *v.* Sweet, 1 Green (N. J.) R., 196.)

The Supreme Court of Wisconsin, and the County Court of Wisconsin, must have had an eye on this New Jersey decision—at all events, they appear to have considered that whether the by-laws of the Milwaukee Gas Company were reasonable or unreasonable was a question *for them to decide*, and that the unreasonableness of many of them *having been demonstrably shown*, it was the duty of the Court to declare them void.

But, says the reviewer, these by-laws were imported so long ago from gas companies in England, and were adopted by the Louisville Gas Company twenty-three years ago, "custom" has hallowed them, the common law protects them; he says:

"In a note to Blackstone, vol. 2, sect. 31, we find that 'proof of a regular usage for twenty years,' not explained or contradicted, is that upon which many private and public rights are held, and sufficient for the jury in finding the existence of an immemorial custom or prescription.'"

The question will obtrude, Why do the gas companies require consumers to sign a special agreement, in every case, to abide by a set of rules or by-laws before supplying them with gas, if their right to do the things specified in their by-laws rests upon regular usage for twenty years, or "immemorial custom or prescription?" Why refuse gas, unless the rules are signed, if your desired privileges are secured by custom? The reader, if a lawyer, will know why, and, if not, his common sense will teach him that the *rules* would not have been made if such invasions of his civil rights had been possible without his individual consent.

But see also Chitty's Blackstone (§ 76): "When a custom is actually proved to exist, the next inquiry is into the legality of it; for if it is not a good custom it ought to be no longer used. '*Malus usus abolendus est*' is an established maxim of law." Also, same (§ 77): "Customs must be *reasonable*, or rather taken negatively, they must not be *unreasonable*." Therefore, whether the rules are by-laws, or customs, the Court having found them *unreasonable*, properly overruled them.

The reviewer charges the Court with error in substantially putting the Milwaukee Gas-Light Company in the category of "monoplies," and undertakes to instruct the Court from the hornbook, as follows:

"Monopoly, in law, is defined by Sir E. Coke (3 Inst., 181, c. 5), 'An institution or allowance by the king, by his grant, commission, or otherwise, to any person or persons, bodies politic and corporate, of or for the sole buying, selling, making, working, or using of anything whereby any person or persons, bodies politic or corporate, are sought to be restrained of any freedom or liberty that they had before, or hindered in their lawful trade.'"

The opinion of the Court, the only source of information relating to the case apparently possessed by the reviewer, states, that by its charter the Milwaukee Gas Company possesses "the exclusive right to manufacture and sell gas *for the purpose of lighting the city of Milwaukee, and the dwellings and business places of its inhabitants, &c.*"

If the corporation or the people of Milwaukee possessed the right to make gas, or to sell gas to light all or any of their dwellings with gas before the Milwaukee Gas Company acquired this *exclusive right* to make and sell gas to light their dwellings and business places, surely the grant to the Milwaukee Gas Company is a grant "whereby any person or persons, or body politic or body corporate," in Milwaukee, is "*restrained of a freedom and liberty that they had before*, or hindered in their lawful trade."

Does the reviewer believe that gas *companies* alone have a right to make and sell gas? If so, why does he try to make out that it is a regular business?

Doubtless he thinks that as gas companies imported the art of making gas from England they have an exclusive right to it, as well as the rules, and that common people, such as the inhabitants of Milwaukee in their individual or corporate capacity, have no right to make gas and sell gas. Lingering memories of trenchant pronunciamentos to the people of Louisville on the gas question, not a thousand years ago, suggest that such a belief is entertained by the reviewer.

But to return to Sidney Shepherd, of Milwaukee. It is to be hoped he will survive the reviewer's opinion of his moral qualities, and that he will continue to stand up for his rights so long as he is sustained by the courts of his State. On reflection, however, he is not the pioneer. A search through the back numbers of the AMERICAN GAS-LIGHT JOURNAL will, no doubt, reveal a Philadelphia case where a gas company was brought to terms by a spirited consumer who believed he had some rights a court was bound to protect.

And to conclude with a word of warning to the County Court, and the Supreme Court of Wisconsin. If the Legislature of that State become as dissatisfied as the reviewer with the competency and "technical knowledge" of these courts, they will interdict them from gas matters, and send to Louisville for authoritative legal talent capable of grasping the subject. Therefore, ——— but, perhaps, the courts can take care of themselves. *A.

New York, October 26, 1862.

THE COMING REVOLUTION IN THE MANUFACTURE OF GAS.

(*Concluded from page* 123.)

PETROLEUM GAS.

However attractive the process of diluting this gas with air may be, its practical application is a different thing. The dilution of gas with air is not novel. As applied to petroleum gas, the process was first used during the last summer. As yet, therefore, it has not borne the test of the cold of winter. Until it can refer to that evidence in its favor, few will venture on its adoption. In truth, it cannot be denied that, from the character of the gas required to bear the addition of air, and the present very objectionable methods in use for its manufacture, the practical difficulties in the way of the air gas are almost insurmountable. Let us inquire into these difficulties.

The oil gasses, like coal-gas, differ in quality. Their value depends on the percentage of olefiant gas and hydrocarbon vapors contained in them. These constituents, when the gas is made by running the oil in to an empty retort or upon heated coke, are in greater or less proportion, according to the intensity of the heat used, and the rapidity with which the oil is allowed to flow into the retort. Using that method, eminent coal-gas engineers have made many experiments to ascertain what degree of heat and what flow of oil would give the best results. Their experience has led them to the following conclusions, viz.: When the heat is low and the feed of oil fast, less gas is obtained, but of great richness. When the heat is high and the feed low, the most gas is obtained, but not in sufficient quantity to compensate for the loss in quality. When the heat is high, and the feed fast enough to give from 60 to 100 feet per gallon of oil, the quality of the gas is according to the quantity made, and when the extreme yield of 100 feet is obtained, its candle power is that of very poor coal-gas.

From these experiments it is evident that just in proportion as the gas made varies in quality, and the heat or cold in the atmosphere changes, the quantity of air mixed in must be increased or diminished—to-day ½, to-morrow ¼—and in winter when the cold becomes severe (and hence the rich vapors in the gas, the presence of which alone justifies the addition of air, are condensed), little or none at all. To meet these contingencies the machine now used for introducing the air will not answer, as it is constructed to deliver always the same quantity. To make it available it should be adjustible, which cannot be accomplished without much complication or a new invention. We will assume, however, that an air-mixer can be made to answer the purpose; the more fatal objection remains, viz., no gas will bear the addition of air to an extent warranting the trouble of introducing it, unless it is heavily charged with hydrocarbon vapors. These are highly condensible* and must be deposited in the pipes and on the valves of the meters by the cold of winter; and even in summer their presence in the proper proportions is dependent on a perfection of manufacture which requires great care, and from which the interest of the company is ever tempting it to fall—as it must be remembered that the high degree of heat and slow rate of feed which give the greatest yield, make the poorest gas, these conditions being destructive to the rich vapors, and favorable to the formation of carbonic oxide.

In this connection the experiment of the writer (stated heretofore) in mixing gas and air, half and half, should be explained. That gas was heavily charged with hydrocarbon vapors, and gave the splendid results stated, *when consumed near the gas-holder*, and in warm weather. A portion of it was afterwards introduced into an old portable gas-holder and there agitated before consumption. The result was very different. The fresh surface, and its mechanical action upon the gas so condensed the vapors in it, that the addition of half air reduced the light to a very low candle power.

It would then seem that in practical use, and with oil-gas as now made, air is not available for dilution. This conclusion confines us to hydrogen for that purpose, and as, according to Prof. Ellett, 4 to 5 per cent. of hydrocarbon vapors when added to hydrogen make a gas of higher illuminating power than good coal-gas, the efforts of engineers should be directed to discover and perfect the best methods for generating hydrogen without any material formation of carbonic oxide. If that could be done cheaply, and Prof. Ellett is right, the capacity of petroleum-gas for dilution with hydrogen would reach from ten to twelve hundred feet per gallon. Such results the wildest dreamer does not look for, but the facts from which they have been deduced prove to us that it is in that direction all efforts to use petroleum gas must be made, not only to obtain the best diluent for it, but to secure the conservative effect which it is well known hydrogen exercises upon hydrocarbon vapors when they are generated in presence.

And what is there in the evidence usually relied on to establish the value of petroleum-gas, to discourage the efforts above advised? Eminent coal-gas engineers say it cannot be made to advantage except with a low heat, which, of course, limits the quantity made and leaves the gas full of condensible vapors. Under the conditions governing the methods used by them this conclusion is just, but new conditions may lead to different results. Judging from his own experience and the reflections growing out of it, the writer ventures to say that for making gas from petroleum, or any other rich hydrocarbon, a *very high* instead of low heat will give the best results, provided only means are found to graduate the action of the heat on the gas-making material, so that its distillation may proceed gradually, and *all* the vapors formed be subjected to contact with the heated surface of the retort, in order to insure a fixed and uniform gas. And provided also, that the apparatus is arranged to expel the gas from the retort as soon as made, as otherwise much of it must be again decomposed, and carbonic oxide made in its stead. This was the hypothesis with which we started, and every step in our investigations seems to confirm it.

* Note.—In proof of how soon condensation takes place from pure oil-gas as ordinarily made, the writer states of his own knowledge that soon after its introduction at St. Johnsville, on the New York Central Railroad, he saw it, and although the burners were very small, the size of the flame was large and the light very bright. A few days since he was at St. Johnsville again, and found the size of the flame not one-half what it was. On remarking this to one of the parties interested, no explanation was given, from which the inference was plain that the want of pressure was the result of a partial filling up of the small pipes, or clogging of the burners.

THE GAS COMMITTEE.

The Special Committee appointed by the Board of Aldermen, for the purpose of investigating the proposed transfer of the right to manufacture and supply gas to the inhabitants of this city, from the New York and Manhattan Gas-Companies, to the corporate authorities of the city of New York, met in room No. 12, in the City Hall, on Tuesday, Oct. 14th, 2½ o'clock P. M. Alderman Farley presided, and Aldermen Walsh and Brady, the remaining members of the committee, were present.

Mr. Francis Morgan stated to the committee that he had used the gas for 12 years, and he believed that he had paid for 25 to 50 per cent. more gas than he had consumed. When his family had been out of town, and not one-fourth the usual amount of gas had been consumed, the bills were as large as at other times. He had never examined the meter to see whether it was defective.

Hon. Mr. Tomlinson argued that the Common Council ought to supply the city with gas, precisely as they do with Croton Water, so that the community should have it at the lowest cost. The only objection urged, had been that men would become corrupt. He believed it impossible that any corruption should grow out of it, sufficient to deprive the community of the relief which this measure would afford.

Henry B. Hertz, Jr., in behalf of Mark Levy, a patentee of a new method of manufacturing wood-gas, offered to put the city in possession of means for supplying gas of 20 per cent. more brilliancy than the coal gas, for $1.25 per thousand feet. This would yield at least 20 to 30 cts. per thousand feet, profit. The price of wood taken as the basis of the estimate, was $6 per cord. There would be no charge to the consumer for service pipes or for meters. Dry meters would be used.

Judge Bronson, the Corporation Counsel, having been sent for, was asked whether the city had the right to make the proposed transfer. He replied that he had not considered the question, and could not give an opinion at present. The contract with the companies seemed to expire by its own limitation in 1853. What the present rights of the respective parties were, he was unprepared to state.

On motion of Alderman Walsh,

The resolution requesting the Corporation Counsel to draw up the necessary papers for a transfer, was referred to him, with a request that he should transmit to the committee his opinion as to what powers the Common Council have in the premises.

The committee then adjourned until 2 o'clock on Friday, Oct. 17th.

Friday, Oct. 17th, 1862.

Two of the members of the committee being absent to attend a funeral, the committee adjourned until Monday next at 2 o'clock.

Monday Oct. 20th, 1862.

The committee met, and the following communication was received from the Counsel of the Corporation:

City of New York—Law Department,
Office of the Counsel to the Corporation,
Oct. 16th, 1862.

To the Board of Aldermen:

In answer to a resolution of your Special Committee on Gas-Light Companies, received yesterday, I have to state that the New York Gas-Light Company was incorporated by the Legislature in 1823, (stat. 1823, p. 99,) and its charter has been twice amended, (stat. 1837, p. 332, and 1855, p. 776.) The Manhattan Gas-Light Company was incorporated in 1830, (stat. 1830, p. 65,) and its charter has been three times amended, (stat, 1847, p. 156; 1852, p. 105, and 1855, p. 1,038.) I notice nothing in either of the charters materially affecting the questions submitted.

The New York Company made a contract with the corporation in 1823, which expired by its own limitation of the city, on the 12th of May, 1853, (vol. ord., p. 566,) and I am not aware that any other contract has been made between the company and the corporation of the city. The real estate of the works constructed for the manufacture of gas still belongs to the company, and can only be acquired by purchase. I find no provision for acquiring the property in any other way.

The Manhattanville Company made a contract with the City Corporation in 1833, which expired by its own limitation on the 12th of May, 1853. (Vol. ord., p. 569.) The company made another contract with the City Corporation in 1848, which will expire on the 5th day of May, 1868. (Vol. ord., p. 573.) So far as I am informed, this contract still remains in full force; but by its terms it may be annulled by the Common Counsil in case of a breach of conditions on the part of the company. Whether terminated in that way, or by the lapse of time, the real estate of the company, and the works which have been constructed for the manufacture of gas, will still belong to the company. If the corporation wishes to obtain the property, it may be acquired by mutual agreement between the parties—in others, words by purchase. I find no provision for acquiring the title in any other way.

Respectfully submitted,
Greene C. Bronson.

There being no further business pending, the committee adjourned until Thursday next at 2 o'clock.

Thursday, Oct. 23d, 1862.

At the appointed hour, no member of the committee was present, nor any one who seemed either to know or care where they were, or why they did not appear. Its chairman having been appointed a Commissioner of the Draft, had left word with the clerk of of the committee, who was also absent, that the meetings of the committee would be indefinitely postponed.

Strike of the Stokers at the Manhattan Gas-Works.—The stokers at the Fourteenth street station of the Manhattan Gas-Light Company struck for higher wages on Tuesday, October 28th. On the 24th of the month they waited on Mr. Combs, the foreman, and informed him of their intention to strike unless their demands were met. They had been, up to that time, receiving $1 50 per day, and asked for an advance to $1 75, at the same time asserting that if they went out of the yard they would not come back again under $2. The foreman promised to lay the matter before the Board, and so it rested. On the 28th, however, no word having been received, the strikers, numbering about one hundred and fifty, marched over to the Eighteenth street works, where they were largely reinforced. A demand was then made on the mechanics, carpenters, &c., to fill the vacancies, and perform the duties of the stokers. This they refused on the ground that they were not familiar with the duties, and had hired as mechanics. They were accordingly discharged, only one of the entire number remaining and performing that line of duty. The strike has been conducted quietly and determinedly, and no manifestation of disorder was exhibited. All is quiet around the works, and save the gathering of small companies here and there, one would not know that a strike had taken place. What will be the result or which party will be obliged first to yield, is one of the uncertainties of the future. The men at preset are firm even to obstinacy.

Metropolitan, New York City.—At a meeting of the Board of Councilmen held on Thursday evening, October 23, a report to grant the Metropolitan Gas Company the privilege of building a pier for the use of their business on the North River, between Forty-first and Forty-second streets, elicited some sharp remarks; Mr. Jones saying that this company had been organized to oppose the old gas monopolies, and given the free privilege of the streets, but they had become a monopoly with the other companies, having bought the Manhattan Company off from the district lying between Thirty-fourth and Sixty-first streets. The grant was concurred in by 18 to 5. The tribulations of the Metorpolitan will soon begin. So long as it was considered an outsider—an opposition company—it stood high in the popular esteem, but now that it has taken its position among the regulars, it must look out for occasional hard knocks.

PATENTS.

UNITED STATES.

36,600.—Charles Boeckh, of Strausburg, France, for Improved Cleaner for Lamp Chimneys:

I claim a brush or rubber for cleaning lamp chimneys, the shaft of which being adapted only to one side of the inner portion of the chimney, and being covered with some rubbing or brushing material, the brush not being round shaped like the common chimney cleaners in use at the present time.

36,602.—John Carton, of Utica, N. Y., for Improvement in Railroad Lamps:

I claim the outer tube, E, the cup thereof forming the chamber, H, and the bottom, B, all constructed and operating substantially as described, in combination.

36,622.—Elias Rhoades, Sen., of Clyde, Ohio, for Improvement in Pumps:

I claim the disk valves, D, perforated heads, B, and ledges, a, in combination with the hollow piston rod, G, and valves, m, and openings, o, when these several parts are constructed, arranged, and operated in connection with the cylinder, A, as and for the purpose specified.

36,623.—H. C. Sergeant, of New York City, for Improvement in Steam Pumps:

I claim the arrangement of the steam and pump cylinders, balance-wheel shaft, cranks and connecting rods, as specified in the foregoing specification.

36,626.—S. H. Sugett, of Eden, Maine, for Instrument for Reaming Out the Barrels of Ships' Pumps:

I claim the reaming instrument, with its cutter, i, chamber, h, and movable plate, a, the whole being arranged substantially as set forth, for the purpose specified.

36,627.—J. E. Thomson, of Buffalo, N. Y., for Improvement in Apparatus for the Manufacture of Illuminating Gas:

I claim a compound retort, D D', containing three chambers, f g h, constructed, arranged and used (either vertically or horizontally), for the purpose and substantially as herein set forth.

36,632.—A. H. Perkins (assignor to himself and J. M. May), of Janesville, Wis., for Improved Process of Treating Coal Tar to Manufacture Roofing Cement:

I claim the new process herein described of treating coal-tar, to form a cement material, for the purposes set forth.

36,649.—Peter Hayden, of Pittsburgh, Pa., for Improvement in Lamps:

I claim a wire clasp extending about two thirds around the chimney ring, shaped and operating as described.

36,661.—W. W. Marsh, of St. Louis, Mo., for Improved Device for Raising Water by Steam:

I claim the combination of the cone, b, with the pipes, C A D, in the manner and for the purpose herein shown and described.

36,663.—Samuel McElroy, of Brooklyn, N. Y., for Improvement in Hydrants:

I claim the combination and arrangement of the vertical hydrant tube, A, adapted to any form of head, having a base, A', chambered to take the valve motion described, with the valve-seat hub, B, and with the internal, movable valve shaft and valve, c c1 c2 c3, operated externally, substantially as described.

36,665.—J. R. Mills, of Bloomfield, Iowa, for Improvement in Pumps:

I claim the valve, j, partition, a, bridge tree or lever, J, projection, m, and rod, k, when combined and arranged to operate in the manner and for the purpose specified, and in combination with the above the piston packing, constructed and operating substantially as described.

36,680.—Albert Taplin, of Providence, R. I., for Improvement in Lamps:

First, I claim the attachment of a spring to the cone or chimney holder, to secure the chimney to the same, when the chimney-holder, cone and chimney are removed from the cap for trimming and lighting the lamp, substantially as and for the purpose herein described.

Second, I claim in lamps having the cone or chimney-holder connected to the lamp by a hinge, making that part of the hinge attached to the chimney-holder of the same piece of metal with the holder, and that part of the hinge attached to the lamp cap of the same piece of metal with the cap, substantially as described and for the purpose set forth.

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GEO. M. ATWATER, Esq., Springfield, Mass.
JAS. D. BREWER, Esq., Pres. Springfield Gas Co
JOHN I. BAKER, Esq., Pres. Beverly Gas Co.
HENRY E. RUSSELL, Esq., Pres. N. Britain Gas Co.
J. DUNHAM, Esq., Pres. Norwich, Ct. Gas Co.
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To James E. Thomson, Toronto and Buffalo.
(Signed) E. W. STEPHENSON.
St. Catherines, October 3.

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Washington, Sept. 17, 1862.

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Mr. ALBERT POTTS, the well known Inventor of the LAMP POST LETTER BOXES, which have been adopted by the Post Office Department for the large cities of the United States—and also of the GAS METER BOX, to be set in the front walls of houses, thus doing away with visits from Gas Inspectors, or burglars in gas-clothing, has lately brought forward a third Invention, which in point of importance and world-wide usefulness, surpasses the others entirely.

These SIGNAL LIGHTS are intended for use on Vessels propelled by Steam, and those exclusively. They specially indicate the presence of a Steamer, and by their use, there will be less likelihood of mistakes, and consequent collision than at present. They are also intended for SIGNALLING AT NIGHT, and can be used for that purpose UNDER ANY CODE of SIGNALS NOW ARRANGED FOR FLAGS.

This Improvement in Lights for Steam Vessels, consists in having the Lanterns containing the colored lights, connected by means of a series of cogged gearing with some convenient part of the Engine or Machinery, so as to cause them to have a revolving motion around their axis. On side wheel steamers, the Lanterns should be placed directly over the wheel-houses, and the power, or motion to turn them, may then be very conveniently obtained from the paddle wheel shaft. On Propellers, the Lanterns should be placed on each side of the Pilot House, or hurricane deck, and the rotary motion derived from any convenient or suitable part of the Engine or Propeller Shaft. Each Lantern is supported on the end of movable cranes, so that their relative positions may be changed and properly adjusted to suit the view of observers on either side of the vessel at the time of signalling.

The Lanterns to be used in this improvement may be constructed for Burning Oils, Fluids, Gas, or any of the known modes of illumination, and should be furnished with one or more lenses and reflectors, so as to concentrate the rays of light, and project them over the horizon with the greatest intensity. The lenses for this purpose should be made with colored glass, viz., Red and Green, and the position of the respective Lanterns, according to the color of the lenses therein, must be placed on the sides of the vessel so as to answer to the requirements of Rules and Regulations made and published by the Supervising Inspectors of Steamboats, agreeably to the Act of Congress of the United States in such cases made and provided. That is to say—by said Regulation—the Lantern having the green lenses for producing the Green Colored Light, must be placed on the starboard side of the vessel, and the other Lantern producing the Red Light, to be placed on the port side thereof in pursuance, also, of the aforesaid Rules and Regulations, there is to be found in board and behind each Lantern, a screen to answer the purposes therein mentioned.

The cogged gearing, by which the Lanterns are connected with the Engine or paddle wheel shaft, and thereby caused to revolve when the Engine is in motion, is so arranged that the connection may be readily shipped or unshipped, and the lanterns made stationary or otherwise, at the pleasure of the Pilot, or those whose duty it may be to operate and attend to the same. The cranes on which the Lanterns are placed, are also rigged so as to be readily turned horizontally from one position to another, so as to present one or both lights to the view of observers when laying athwart ships at the time of signalling.

On the Use and Application of the Improvement for Night Signals.

When the vessel is under weigh, or going ahead in its course, the Lanterns are to be placed directly athwart ships, so that such colored light therein will then have the position and place prescribed by Rule Seventh of the aforesaid Supervising Inspectors of Steam Boats, and with the screens behind them, as above described, will then answer all the intents and purposes for which the colored lights are thus required to be used, as illustrated in the several diagrams published by said Inspectors for the working of a system of Colored Lights. The Lights in this case, according to the color seen by the observer, indicate the course or direction of the vessel whereon they are carried. When the Lanterns with the colored lights therein, are made to revolve around on their axis, as proposed in this improvement, in addition to the signal above, another, and as we believe, very important and useful signal is thus formed, indicating that the vessel, whereon it is carried is a Steamer. In dark foggy nights, it is found by experience, to be somewhat of a difficult task to distinguish sailing vessels from Steamers and Propellers, especially when the latter are rigged, and carry a press of sail. When Steamers meet "head and head," it is the duty of each to pass to the right, or, on the larboard side of the other. Whereas, when a Steamer meets a sailing vessel, the former must give way and allow the latter to pursue its course. Hence, to carry out the regulations of the said Steamboat Inspectors, and prevent collisions, it is important to have some infallible sign, whereby the character of the vessel may be readily seen and determined. Several very fatal collisions have recently taken place through mistakes of this kind.

On Signals for Speed and Distance.

The gearing of the Lanterns with the paddle wheel or propeller shaft, may be so arranged as to be an index of their speed. A very good proportion, would probably be to make the Laterns turn about one third as fast as said shaft. Hence, when the speed of the vessel is previously known, when making a certain number of revolutions of the paddle or propeller, it becomes an easy task from observing the time with which the Lanterns thereon may be turning to approximate to the speed with which the said vessel is moving at the time of observation. Again, as the arcs described by the rays of light from each lantern, as they revolve around on their axis, is greater in proportion to the distance from said lantern, so will the time in which said rays move over any given space, be less in the same proportion. Hence, when the lights are very remote, or far off, from the observer, the duration of each column or cylinder, of rays from each lense, would pass the eye of the observer, in a short space of time, or with great velocity. Whereas, at a nearer point of observation, the time of its passage would be considerably lengthened, or the motion thereof apparently much slower. From these facts, we believe the improvement is susceptible of indicating, in an approximate manner, the speed and distance of vessels whereon the revolving lights may be used.

On the Application of the Improvement for Marine Telegraphic Purposes.

The Revolving Lights can be readily applied to the general purposes of Marine Signalling at night, as follows: In order to show this application, we have adopted the Numbers as given in Roger's Code of Marine Day Signals, believing that work to be somewhat of a standard in matters of this kind. Instead of the flags used in the above code, for day signals, to indicate the combinations of two or more letters of the Alphabet, which combination is referable to certain numbers indicative of the words or sentences telegraphed, we propose to perform the same operation, at night, by means of the two revolving colored lights, so as to indicate the numbers directly to which the intended words or sentences to be telegraphed are referable. Thus, whether the vessel to be signalled is ahead, astern, or abaft the beam, the position of the two colored lights must be so adjusted, by means of the moveable cranes, whereon said lanterns or lights are fixed, that the two lights may be fully made visible to the observer. When both lights are thrown into this position, stopping the motion of the lanterns may be the signal for calling attention, or a rocket fired off, or the steam whistle blown, would answer the same purpose. Now, in order to represent the ten numerals, we propose to indicate them by the respective motions of the two colored lights, as follows:

RED LIGHT.				GREEN LIGHT.			
One Red,	Represents	Number	1.	Two Green,	Represents	Number	2.
Three do.	do.	do.	3,	Four do.	do.	do.	4.
Five do.	do.	do.	5.	Six do.	do	do.	6.
Seven do.	do.	do.	7.	Eight do.	do.	do.	8.
Nine do.	do.	do.	9.	One do.	do.	do.	0.

In the above arrangement, it will be seen that all the odd numbers are made by the Red Light, and the even numbers by the Green Light. In order to indicate the repeat of the last number, once or more times, or for other special purposes, which may hereafter be found useful and necessary, an even number of lights may be shown by the Red, and an odd number by the Green. It will be understood that when the Lanterns are made with three lenses in them, the numerals as above arranged are formed by the number of times a new light or lense is presented to the observer. Thus to indicate the number 3, the Red Light or Lantern would make one entire revolution; and to make the number 6, the Lantern carrying the Green Light would make two revolutions, and so on with the other numbers. When a symbol is made, the motion of the Lantern is to be suspended for a short time, and when a number expressing a sentence is formed, the lantern may be stopped for a longer period, or some one of the special signals above referred to, may be used for this purpose.

To show the application of this improvement as above mentioned, whereby these Lights can be used as readily for Night Signals, as Flags are used for Day Signals by the author of Roger's Code, we shall use the sign O colored red or green, according to the light used, to show the number of movements performed by the respective lights in order to represent any desired number of said code, suitable for the required purpose.

RED LIGHT.	GREEN LIGHT.
O, O, O, O, O,	
O, O, O, O, O, O, O.	
	O, O.
	O. O.

The above would represent the number 5722, and by reference to said Roger's Code, would be found to stand before the sentence:

"WILL YOU SHOW THE NUMBER THAT REPRESENTS YOUR NAME?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O.	
O, O, O, O, O, O, O.	
	O, O.

Here the number expressed is 1572, and per the same Code, stands for

"WHERE ARE YOU BOUND?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O, C, O, O, O.	
	O, O.
	O, O, O, O, O, O, O, O, O.

The number thus expressed is 1928, and per said Code is

"WHAT IS YOUR CARGO?"

RED LIGHT.	GREEN LIGHT.
O, O, O, O, O.	
	O, O, O, O, O, O.
	O.
O, O, O.	

Here the number expressed is 5603, and stands for

"HAVE YOU ANY NEWS?"

(RED LIGHT.)

Fig. 2

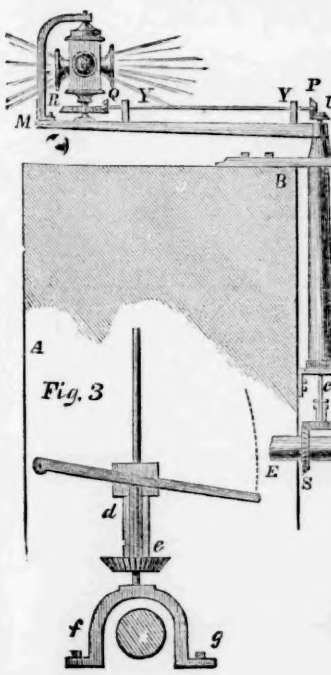


Fig. 3

(GREEN LIGHT)

Fig. 1

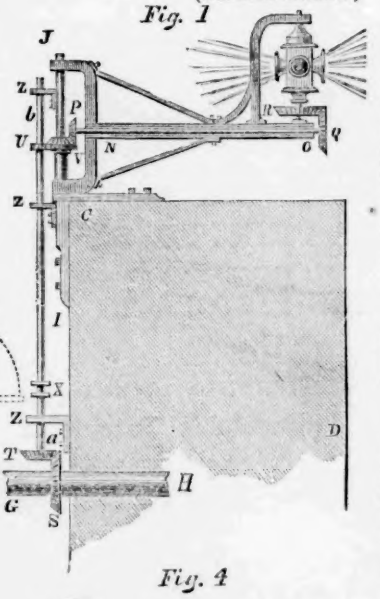


Fig. 4

MECHANICAL CONSTRUCTION.

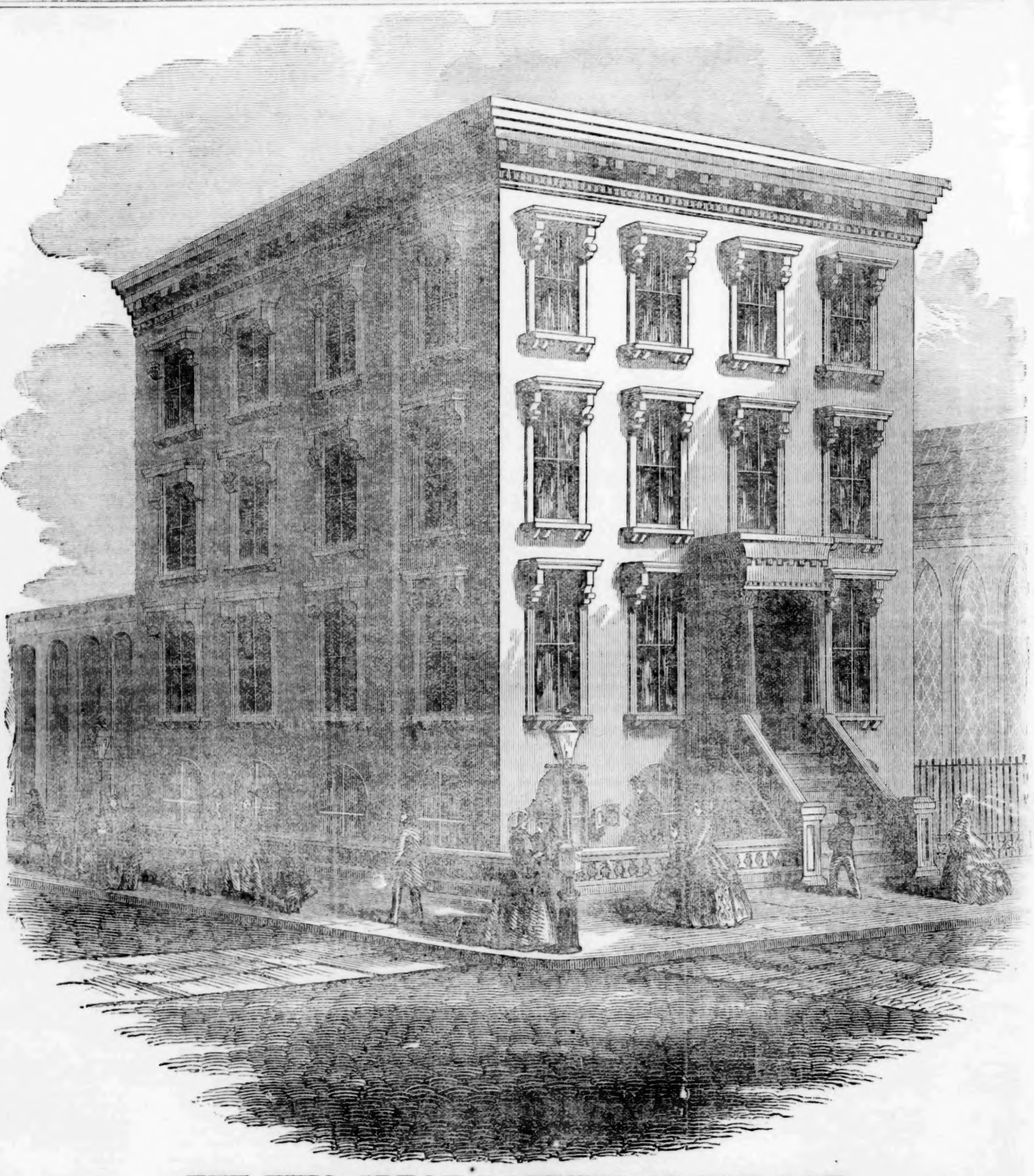
In our engravings, Figs. 1 and 2, represent Vertical Sections through the wheel-house. In them E F and G H represent portions of the main Shaft. In Fig. 1, I J is a stout Iron or Wooden post, fastened against the side of the wheel-house, directly over the main shaft. On the upper part of this post, is fitted the moveable arm or crane N O, to the main shaft is fitted the bevel wheel S, and to the lower end of the rod a b, is fitted a corresponding wheel T. U is a small pinion on a b, which gears with the spur wheel, V, which in turns gives motion to the wheels, P and Q, and so revolves the lamp R. It will be seen that a Rotary motion is given to the lamp, when the main shaft is in motion and a b connected.

It can be disconnected by a lever, acting between the bosses X, which will elevate the rod in the guides Z Z Z.

Fig. 2 is another arrangement, for the same purpose. In this, K L represent a hollow Shaft, on which is firmly fastened, the arm L M, on which is the lantern. The hollow post is secured to the wheel-house by the straps K and B, and it can turn freely in them, the other part being the same in them as in fig. 1

The lever K W, when drawn down, will turn the frame in any required position around the Shaft c U. In fig. 1, the arm or crane N O, may be operated by cords from the wheel house, but in this device, the rod c U, does not lift up as in fig. 1, but in its place, the lower end is made square, and on it slides the short tube, d E shown in fig. 3. The lower end of the rod turns on a bridge, f g, spanning the main shaft. On the upper end of the tube, d e, a lever is attached by means of boxes and collars as shown in fig. 4. This lever when raised carries with it the beveled wheel T, thus disconnecting the gearing apparatus.

ALBERT POTTS, Patentee,
PHILADELPHIA, Pa.



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Photometers, Pressure Registers, Indicators, and Gauges, Governors, Meter Provers, Centre Seals, Fluid Gauges, &c.
GAS APPARATUS
Of the most reliable and approved construction manufactured and on hand at the
UNION GAS METER WORKS.

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Continue to Manufacture at the Old Stand
1502 & 1504 Filbert St., Phila.,
GAS METERS (Wet and Dry),
STATION METERS,
PRESSURE REGISTERS,
GOVERNORS,
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and *all* other articles in their line as heretofore.

H. R. WORTHINGTON'S PATENT Water-Meter.—This Meter combines accuracy, simplicity and remarkable durability, with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our largest cities.
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Manufacturer of CLAY RETORTS, FIRE BRICKS, and every description of FIRE CLAY GOODS.

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Dealers in Tiles, Arch-Bricks, Furnace-Doors, MOUTH-PIECES, COVERS,
And all other Fittings, of the most approved patterns, for setting Clay Retorts.
SABBATON'S PATENT FURNACE-DOORS, & FRAMES,
Floyd's Patent Malleable Iron Retort Covers,
MCKENZIE'S PATENT GAS EXHAUSTERS,
made by Addison Smith. Compensator-Valves, &c. Gas, Water, and Steam Tubes.

PHILADELPHIA FIRE-BRICK Works, corner of Vine and Twenty-third streets, Philadelphia.
JOHN NEWKUMET,
Manufacturer of all kinds of FIRE-BRICK, GAS-HOUSE TILES, to suit all the different plans in use. Clay Retorts and Dentists' Muffles. Orders filled at short notice.

PATENT PYRO-CLAY GAS RETORTS. THOMAS HOADLEY, Patentee, wishes to call the attention of Gas-Engineers to these
RETORTS.
as a very superior article.
REFERENCES:—Gas-Light Works, Buffalo, N. Y.
" " Cleveland, O.
" " Chicago, Ill.
THOS. HOADLEY,
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NEW YORK FIRE-BRICK Manufactory. (Branch Works at Kreischerville, Staten Island.)
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GAS-HOUSE TILES and FIRE-BRICK of all shapes and sizes. FIRE MORTAR, CLAY, and SAND articles of every description made to order at the shortest notice. B. KREISCHER, M. MAURER, A. WEBER.

PATENT BITUMINIZED PIPES,

For the Conveyance of Water, Gas, and Drainage.

This important invention, patented by Mr. Charles Newbold, and now for the first time introduced to the public, may confidently be stated to be one of the greatest interest and commercial value, as the Patent Bituminized Pipes possess all the qualities necessary for the conveyance of Water, Gas, Sewage, Mine-Pumps, &c., viz.: great strength, great durability, and inoxidability, with the immense advantage of being about *one fifth* the weight of iron pipes, and about 35 per cent. cheaper; whilst, compared with lead pipes, the Bituminized Pipes are only about *one fourth* their price, without the possibility of the formation of the oxide and carbonate of lead, so dangerous for every purpose. They will stand 150 degrees of Heat, and after many trials it has been satisfactorily proved that rats or vermin will not touch them. They also withstand the action of all acids and salts.

Iron pipes are at present frequently covered with a coating of bitumen or coal tar before they are laid down; but the adherence of this coating to the metal being very imperfect, on account of vibration and the difference of expansion, this preservation is insufficient, besides being exposed to a number of influences which neutralize its efficacy—galvanic currents materially assist the formation of oxides and deposits, which cause the obstruction and eventually the destruction of metallic pipes.

The Patent Bituminized Pipes are neutral, non-conductors of electricity, and consequently are not exposed to any of the deteriorating influences mentioned above. The process of manufacture of these Pipes consist in causing a roll of paper to pass through a reservoir of melted bitumen, after which it is tightly coiled around a mandril to any required thickness; and thus, when hardened, a tube is formed of perfect texture, great hardness, and enormous strength. These Pipes are proved, by hydraulic pressure, to resist a pressure of 220 lbs. to the square inch, equal to 506 feet head of water, which is more than double the altitude of the highest reservoir. The bituminous composition which unites and covers these Pipes is so well known as an excellent preservative, that it will be unnecessary to demonstrate that, when laid underground, the durability of the Patent Bituminized Pipes may be considered as unlimited. The Pipes are made in lengths of seven feet, and are connected by socket joints of the same material as the Pipes; or they can be fitted with iron flanged sockets, screwed together in a most simple and inexpensive manner.

For Gas these Pipes are invaluable; the Gas-lining which we insert effectualy resists the action of Gas, and being non-conductors, there can be no condensation in them, and the joints made with the Patent Cement are so strong as to entirely prevent Leakage.

The cost of laying the Pipe is also small, compared with those of iron, and can be done by mere laborers. The Bituminized Pipes have been in use the last three years, for the conveyance of gas and have been ascertained to be as perfect now as when first laid down.

DIRECTIONS FOR JOINING THE PATENT BITUMINIZED PIPES.

Pack the pipes level in the ordinary way; slip the collar over one of the pipes; draw the ends close together and warm them by putting a hot iron between them; then press them together so as to make them adhere; take a piece of iron wire netting, about half an inch in the mesh, a little narrower than the length of the collar, and long enough to wrap once round the pipe, spread the collar over it and the joining; close the ends with clay; pour the melted cement into the manhole of the collar, and fill up the interior space; then remove the clay and the joint is finished.

It is necessary to leave a small vent hole in the clay at each end of the collar to allow the air to escape as the cement is poured in, that there may be no flaws or air bubles in it when cold. If in cooling the cement settles in the manhole, fill up again.

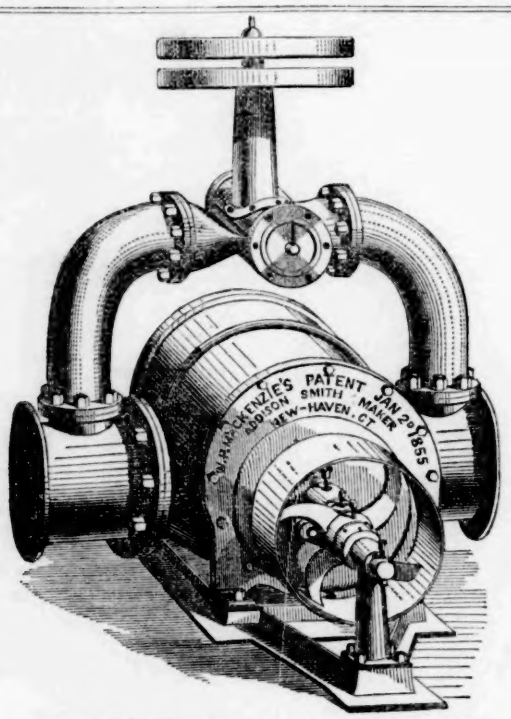
N. B.—The cement should be broken into small pieces and melted in a pot as you do lead, at a low temperature, until it is dissolved; it must be stirred while melting; then take it off and keep stiring it as it cools until it becomes nearly as liquid as water; then pour quickly.

All Orders should be addressed to

THE AMERICAN BITUMINIZED PIPE COMPANY,
OFFICE 24 WATER STREET, BOSTON, MASS.,
J. McGEARY, AGENT;

or to FREDERICK W. BOND,
SOLE AGENT FOR NEW YORK,
58 LIBERTY STREET, (Between Broadway and Nassau Streets,) **NEW YORK.**

Cement for Joining, For Sale as above.



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Sole Proprietors and Manufacturers of

THE MACKENZIE PATENT GAS EXHAUSTER AND PATENT COMPENSATOR.

They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

MACKENZIE PATENT BLOWER, PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan. The Cupolas are manufactured in sizes to melt from 1 ton to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent. fuel. Address SMITH & SAYRE, 458 Broadway, New York.

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PRINCE'S METALLIC PAINT,

AN INDESTRUCTIBLE COATING FOR

IRON, TIN, and WOOD.

It consists of seventy-two parts Oxide of Iron, and twenty-eight parts Cement Lime Stone in the one hundred pounds.

It has much more body than red or white lead. It is warranted perfectly water and fire-proof and to withstand a greater heat on metals, without scaling, than any other paint in use.

It is a perfect cover for all kinds of iron, tin, or wood-work, out-houses, and canvas coverings. It prevents and arrests the corrosion of metals, and is not affected by the action of salt, gases, acids or ammonia.

It hardens under water, as has been fully demonstrated by its application to gas-holders, by many of the largest gas companies in the United States; which companies having thoroughly tested its properties as herein claimed, pronounce in its favor over any other paints in the market, even though sold at double its price.

As a coating for patterns of iron or wood, when mixed with shellac, it is much superior to beeswax, oil, or shellac alone, as has been proven at the large founderies in the country.

For patching boilers and making joints, it is considered superior to red lead, or any other preparation.

For cleaning metals it takes the place of crocus, rouge, and emery, being better and cheaper.

This Paint requires no more oil than dry lead or zinc, and much less than the ordinary mineral paints. It is free from any waste, and possesses a spreading and covering power unequaled.

Terms, by the Barrel or Half Barrel, Four Cents per Pound.

A liberal discount made to parties purchasing by the ton.

A Barrel or Ton will be forwarded to any gas companies desirous of testing its qualities, for which there will be no charge if it does not give entire satisfaction as being the cheapest and most durable of all other Paints in the market.

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